

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 2]

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VIII.—GARDEN NOTES ON NEW TREES AND
SHRUBS.

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(WITH PLATES.)

XIV.—A NEW HYBRID BETWEEN GOOSEBERRY AND
BLACK CURRANT.

Ribes wollense, new hybrid [Saxifragaceae].

In August, 1913, some specimens of an interesting hybrid between the black currant (*Ribes nigrum*) and the gooseberry (*R. Grossularia*) were received at Kew, through Mr. W. B. Boyd, from Mr. W. J. Bell, of The Woll, Hawick, N.B. This is not the first hybrid that has occurred between the same species. About 1880, *R. Culverwellii*, Macfarlane, was raised at Thorpe Perrow in Yorkshire (see *Gardeners' Chronicle*, May 19, 1883, p. 635), and another named *R. Schneideri* (see Koehne in *Gartenflora*, 1902, p. 409) has appeared on the Continent. The plants growing at The Woll are quite distinct from both.

There are at present about a dozen bushes growing in Mr. Bell's grounds, one of which has a main stem 12 ins. in girth. The origin of the plants is not known, but they are evidently very old; Mr. Boyd thinks 60 or 70 years. An old gardener whose recollections of the place went back forty years did not remember them being planted, but knew that gooseberry bushes and black currants once grew wild on the spot. It appears probable that it was from these that the hybrid bushes were derived, the cross-fertilisation being, no doubt, effected by insect agency; but it is rather curious that neither of the parent species now grows there. The hybrid alone remains.

R. wollense is perhaps more nearly related to *R. Grossularia* than to *R. nigrum*, especially in the foliage and flower; but it shows the influence of the latter in the fruit, which is black, of the same size as the black currant, quite smooth, borne three or more on a raceme, and has a distinct suggestion of black currant in its flavour.

Description.—A deciduous shrub, about 6 ft. high, of lax, spreading habit, the lower branches prostrate; branchlets yellowish

grey, minutely pubescent, armed with simple, stiff, slightly decurved, sharp spines $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Leaves $1\frac{1}{2}$ to $2\frac{1}{2}$ ins. wide, scarcely so long, deeply three- (or sometimes five-) lobed, the sinuses reaching often half-way to the midrib, the lobes coarsely dentate, the teeth often gland-tipped as in *R. nigrum*; sparsely covered with short hairs on both surfaces; petiole variable in length, sometimes half as long as, sometimes longer than, the blade, pubescent. The leaves, although similar to those of the gooseberry in shape, have scattered glands beneath, and have, to a slight extent, the characteristic odour of the black currant. Flowers borne in two- or three-flowered drooping corymbs; their arrangement therefore is intermediate between the solitary flowers of *R. Grossularia* and the six- or eight-flowered raceme of *R. nigrum*. The style is clothed with white hairs at the base as in the gooseberry. Fruit glabrous, shining black when ripe, globose, $\frac{3}{8}$ in. in diameter, crowned with the shrivelled remains of the flower nearly or quite as long as itself. The taste is acid, like that of the gooseberry, but with a flavour also of black currant.

XV.—TWO NEW HORSE-CHESTNUTS.

Aesculus chinensis, Bunge [Sapindaceae].

For many years a horse-chestnut has been grown on the Continent under this name, but the true *A. chinensis* of Bunge does not appear really to have reached cultivation in Europe until introduced by W. Purdom from North China two years ago. It is possible that a single tree may have existed in the Segrez Arboretum in France, but what was usually grown under the name was in reality the Japanese *A. turbinata* (see Gard. Chron. June 8, 1889, p. 717).

A. chinensis is a large tree of rounded form and up to 80 or 90 ft. high. Its young shoots are glabrous or minutely downy, and its leaves five- to seven-foliolate. Leaflets narrowly obovate to narrowly oval, up to $7\frac{1}{2}$ ins. long by $2\frac{1}{2}$ ins. wide, with fifteen to eighteen pairs of veins; they are thinly pilose on the veins beneath. Panicles up to 14 ins. long and $3\frac{1}{2}$ ins. wide at the base, tapered upwards. The flowers have not been seen on cultivated plants, but they are described as white, $\frac{1}{2}$ to $\frac{3}{4}$ in. wide, the stamens rather longer than the petals. Fruit subglobose, truncate or slightly depressed at the top, 2 ins. in diameter, rough.

Like *A. indica*, the species belongs to K. Koch's section *Calothyrsus*, and should prove hardier than is that species.

A. Wilsonii, Rehder [Sapindaceae]. In 1900, Wilson collected in West Hupeh specimens of a horse-chestnut which was at first considered to be identical with the North Chinese tree just described. He introduced it by seeds to the Arnold Arboretum in 1908 and it has since been presented to Kew by Prof. Sargent. Besides occupying a distinct natural area, it differs from Bunge's *A. chinensis* in a number of particulars sufficient to justify Mr. Rehder in keeping it separate under the above name. Its distinctions are as follows:—Leaflets longer-stalked, not generally so markedly cuneate at the base but rounded or even subcordate there; more downy or even villose at first beneath (but becoming

glabrous in both species); veins more numerous (up to 22 pairs), forming at their junction with the midrib a more obtuse angle than in *A. chinensis*; seed larger, with the hilum covering about one-third; enclosed in a thinner-walled, ovoid to pear-shaped fruit.

With its more southern distribution this tree may prove not to be quite so hardy as *A. chinensis*, and it has been cut back once by winter cold at Kew. But that may have been due to its excessive vigour and the unripened state of its wood. Wilson believes it will be hardy, and, if so, its splendid panicles, up to 16 ins. high, should make it a welcome addition to exotic trees.

XVI.—A NEW JAPANESE CHERRY.

***Prunus microlepis*, Koehne var. *Smithii*, Koehne** [Rosaceae].

Under the erroneous name of *Prunus Miqueliana*, this cherry has been cultivated in this country for some three or four years, and has created a good deal of interest because of its flowering from November onwards. Owing probably to the excessive mildness of the late autumn of 1913, it made a very charming display at that time. When it was in flower it was sent to Professor Koehne at Berlin—the leading European authority on this genus—and he pronounced it to be a many-petalled form of his *P. microlepis*, originally described in *Plantae Wilsonianae*, i., p. 256 (1912). Normally, *P. microlepis* has five petals to each flower; for this form, which has 10 to 15, Prof. Koehne suggests the varietal name *Smithii*, to associate with the plant the name of Mr. T. Smith, of Newry, who introduced it from Japan.

It is a deciduous small tree with ovate to ovate-lanceolate, acuminate leaves, sharply serrate (the teeth gland-tipped), $1\frac{1}{2}$ to $3\frac{1}{2}$ ins. long, hairy on both surfaces. Flowers, pale pink, 1 in. wide; the petals obovate, often notched at the apex. Stamens white with yellow anthers; style glabrous. Calyx, glossy green, glabrous, tubular at the base, with five reflexed, ovate lobes $\frac{1}{8}$ in. long, toothed, pointed.

XVII.—NEW CHINESE SPECIES.

***Rhododendron fastigiatum*, Franchet** [Ericaceae].

There is a considerable demand at the present time for dwarf evergreens suitable for cultivation in the Rock Garden. Several alpine *Rhododendrons* introduced by Wilson are admirable for the purpose, such as *R. flavidum*, *R. intricatum*, and *R. nigro-punctatum*. This new species, introduced by Forrest in 1911, belongs to the same class and is likely to be useful for the same purpose. It is an evergreen shrub 6 to 18 ins. high, the young shoots, leaves and calyx being covered with scales, which give them a dull greyish tinge. The leaves are oval or ovate, averaging about $\frac{1}{2}$ in. in length, half as wide, the petiole one line long. Flowers slightly fragrant and clustered two or three together at the end of the shoot. Calyx-lobes $\frac{1}{8}$ in. long, ciliate; corolla 1 in. in diameter, pale purple, with five or six ovate lobes spreading horizontally; the tube is very short and hairy. Stamens, ten or twelve, hairy at the extreme base, much exserted, purple; anthers brownish; style purple, longer than stamens.

At first sight, both in leaf and colour of flower, this species recalls *R. intricatum* very strongly. It is, however, amply distinguished by its long stamens, those of *R. intricatum* being enclosed in the corolla-tube. It is a very dainty shrub. The seed from which the plants at Kew were raised was presented by Mr. J. C. Williams, in whose garden at Caerhays, as well as at Kew, it flowered in the autumn of 1912—less than eighteen months from the sowing of the seed. This autumn-flowering is probably abnormal. Mr. Forrest says it is the dominant species on open pasture land on the summit of the Sung-Kivee Pass, Western China.

Rubus Giral dianus, Focke [Rosaceae].

Among the shrubs worth planting for winter effect, the white-stemmed brambles must be counted as some of the most noteworthy. Until the recent exploration of Central and Western China by plant collectors, the best *Rubus* of this character was the Himalayan *R. biflorus*. Now, however, it is surpassed in grace and general effectiveness by a new species from Shen-si and Szechuan—*R. Giral dianus*. This has a very striking, fountain-like habit, the stems growing erect for 5 to 7 ft., then arching over so that the tips reach the ground. Here they form thickened nodules and push forth roots, so that the propagation of this species will be very simple. The stems are covered with a white (or blue-white) waxy bloom, which acquires its most vivid hue in October, remaining good, however, all the winter. By spring-time the bloom has become more or less worn away. The stems are biennial, reaching their full length by the first autumn, flowering the next spring and ripening the fruit, which is black, by late summer. They should then be cut out, leaving only the new stems. The leaves are pinnate, consisting usually of nine leaflets, which are ovate to rhomboidal, $1\frac{1}{2}$ to $2\frac{1}{2}$ ins. long, half as wide, coarsely toothed, glabrous above, covered with a close white felt beneath. Originally discovered by Giral di, this fine *Rubus* was introduced into cultivation by Wilson in 1907.

Schizandra Henryi, Clarke [Magnoliaceae].

For many years the genus *Schizandra* was represented in gardens by only one species, *S. chinensis*, Baillon. In late years several new species have been introduced from Western China, the most interesting amongst them, perhaps, being *S. Henryi*, which Wilson sent home in 1900 when collecting for Messrs. Veitch. A fine plant, probably the best in the country, which for several years past has been an object of great interest to arboriculturists visiting the Coombe Wood Nursery, was purchased for Kew last autumn. It is planted near the Magnolias in the Berberis Dell.

S. Henryi is a deciduous climbing shrub said to grow 20 to 30 ft. high; the young branchlets are triangular, each angle winged. Leaves coriaceous, shining, varying in shape from elliptical to ovate and cordate, 3 to 4 ins. long. The flowers are solitary on stout stalks 2 ins. long; they are each $\frac{1}{2}$ in. in diameter and white. The female flower is very interesting in the transformation that takes place after fertilisation. As in *Magnolia*, the carpels are



RUBUS GIRALDIANUS.



SPIRAEA ARBOREA.

arranged on a columnar receptacle which, after the flowers have faded, elongates, becomes fleshy and 2 or 3 ins. long. On this the fruits are borne in a sort of spike. The fruits have not been seen in cultivation, but they are said to be mucilaginous and eaten by the Chinese.

Spiraea arborea, Bean (*Sorbaria arborea*, C. K. Schneider) [Rosaceae].

This is a very promising addition to the *Sorbaria* (or pinnate-leaved) section of the genus *Spiraea*, previously represented in cultivation by *S. Lindleyana*, *S. Aitchisonii*, and *S. sorbifolia*. Judging by Wilson's description this new species is the most tree-like of all the *Spiraeas*, being sometimes 30 ft. in height. It has, palpably, a close relationship with *S. Lindleyana*, but, besides being a more robust plant, is distinguishable by the hairs beneath the leaflets being stellate (simple in *S. Lindleyana*), also by the shorter calyx-tube and longer stamens. As may be seen from our illustration, the general effect of the panicles is much the same, the flowers being of the same ivory shade of white. Wilson found it in Hupeh and Szechuan and collected it as long ago as 1900 during the first Veitchian journey, but did not apparently introduce it to cultivation until 1908 when travelling for Harvard University. It is a useful addition to a class of shrubs which it is very desirable to augment in gardens, viz., those that flower in July and later.

Tilia Oliveri, Szyzylowicz [Tiliaceae].

There have been for many years in cultivation two lindens whose leaves are silvery underneath, namely, *Tilia petiolaris* and *T. tomentosa* (*T. argentea*). A third has latterly been added in *T. Oliveri*. It was first discovered by Henry in the mountains north of the Yangtze-kiang as long ago as 1888. Wilson introduced it for Messrs. Veitch some twelve or thirteen years later to the Coombe Wood Nursery, where it was propagated, and whence it has since been acquired for Kew. It is a deciduous tree attaining 50 ft. in stature, its young shoots glabrous. Henry describes the leaves on wild trees as 3 to 4 ins. long and nearly as wide, but on young, cultivated ones they are as much as $6\frac{1}{2}$ ins. long and $5\frac{1}{2}$ ins. wide; the upper surface is dark green, glabrous; the lower one clothed with a close white felt. Flowers have probably not yet been borne by cultivated plants, but the cymes on wild specimens are 3 ins. long, carrying about twenty flowers. Fruit globose, $\frac{1}{3}$ in. in diameter, apiculate, warted and covered with grey tomentum.

Tilia Oliveri is succeeding very well under cultivation and promises to be at least as ornamental a tree as *T. tomentosa*. From that species and *T. petiolaris*, the only other limes with which it is likely to be confused, it is easily distinguished by its quite glabrous young branchlets.

Viburnum Harryanum, Rehder [Caprifoliaceae].

An evergreen shrub ultimately 6 to 8 ft. high of bushy habit; young shoots clothed with a minute dark pubescence. Leaves orbicular to obovate, or broadly ovate, tapered at the base, rounded

at the apex, mucronate; margins entire or with a few obscure teeth; $\frac{1}{4}$ to 1 in. long, from two-thirds to nearly as wide; dark dull green above, paler beneath, perfectly glabrous; petiole $\frac{1}{12}$ in. long, reddish. Inflorescence a terminal compound umbel 1 to $1\frac{1}{2}$ ins. across; peduncle glabrous, $\frac{3}{4}$ to 1 in. long. Flowers unknown. Fruit pointed, ovoid, $\frac{1}{6}$ in. long, black, shining.

Wilson discovered this remarkable *Viburnum* in 1904 in Western China, on his second journey for Messrs. Veitch. It has recently been named in honour of the head of that firm, Sir Harry Veitch. Wilson (under his No. 3733, Veitchian journey) notes that he found it on mountains up to 9000 feet, but that it was rare. It is perfectly distinct from any other evergreen *Viburnum* in the smallness of its leaves, which give it rather the aspect of a privet than a *Viburnum*. It has recently been added to the Kew collection by purchase from Coombe Wood. Judging by the quick and easy way cuttings have taken root, even in late autumn, its place in gardens should be assured, especially if it proves to have any ornamental qualities at all commensurate with its interest and distinctness.

IX.--THE GENUS ATICHIA.

A. D. COTTON.

INTRODUCTION.

During the early part of last winter an interesting organism was forwarded to Kew from Dominica by Dr. Francis Watts, Commissioner of Agriculture for the West Indies. The plant proved to be a new species of *Atichia*, a genus of fungi of obscure affinity, and until recently but imperfectly known. As species of *Atichia* have never before been received at Kew for examination, it has been thought advisable to give an account not only of the West Indian plant, but also of the genus as a whole, together with a conspectus of the known species.

The specimens forwarded to Kew were found by Mr. J. Jones, Curator of the Botanic Station, on a plantation of limes at Sensitive Estate, Dominica, and sent to Mr. F. W. South, at that time Mycologist in the Imperial Department of Agriculture for the West Indies. The organism occurred on the upper side of the lime leaves, and appeared as small black star-shaped bodies 4-5 mm. in diameter (Fig. 1). The leaves themselves were infected with the scale *Lepidosaphes beckii*, and as the fungus was usually attached to the latter it was thought that it might possibly be parasitic. Several other fungi were present on the leaves forwarded, some of which were connected with the scale insect others not, but all, with the exception of the organism mentioned above, were referable to well-known fungus genera. The star-shaped bodies resembled a lichen such as *Collema* in appearance, being gelatinous and swelling when moistened after the manner of species of that genus. In structure, however, they showed a resemblance to certain members of the Red Algae (*Florideae*) being composed of branched moniliform filaments more or less

held together in mucilage, loosely arranged in the centre and more compact towards the periphery. The general structure was utterly unlike that of an ordinary fungus, and from an alga the plant differed in the fact that the filaments were apparently devoid of colouring matter, whilst from a lichen they were equally distinct through the absence of gonidia—the algal cells characteristic of that group. As no bodies which could be definitely referred to spores were present, the organism was set aside until fertile specimens should be obtained, and a request was forwarded to Dr. Watts asking for further material and for information on the colour of the cell-contents when fresh.

Additional supplies were subsequently received from Mr. J. Jones, Curator of the Botanic Station, Dominica, and through the Commissioner of Agriculture, and these gave the necessary clue for identification. One of these samples provided the conidia-like spores, and the other abundance of asci and ascospores. The presence of asci proved that the plant was not an alga, and, the absence of gonidia being confirmed, its place had to be sought amongst the fungi. Here it was ultimately traced to the genus *Atichia*, which, on account of its having been originally described as a lichen, had been omitted from Saccardo's *Sylloge Fungorum*. For half a century the genus had contained but a single minute species *A. glomerulosa*, but during recent years several others had been added, an account of which is given below.

HISTORY OF THE GENUS.

The genus *Atichia* was founded by Flotow in 1850 for the reception of *Collema glomerulosum*, Ach., a gelatinous plant which occurs as wart-like masses 1–2 mm. in diameter on leaves of conifers in Southern Europe. Flotow noted its peculiar structure and the entire absence of green colour in the tissues, but states he had no hesitation in leaving it in the lichen family *Collemaceae*. He named it *A. Mosigii*, not *A. glomerulosa* as has been assumed by subsequent writers. In 1870 (Brit. Mus. copy) Millardet, in a memoir on the *Collemaceae*, gave a full account of the structure of this plant, illustrated with beautiful figures. He employs here Flotow's name *A. Mosigii* though he had previously referred to it as *Hyphodictyon lichenoides* (gen. et sp. nov.). Millardet also described reproductive bodies which he termed conidia. From that date till 1900 nothing appears to have been added to our knowledge of the genus though several poorly described fungi which had been referred to various groups are now known to represent species of *Atichia*. Saccardo omitted the genus altogether from his *Sylloge*, but in Rabenhorst's *Cryptogamen Flora* it is placed by Rehm as a genus of doubtful position in an appendix to the *Bulgariaceae* (iii., p. 500). The first writer who rejected the plant as a lichen was Millardet, and Stein was the author who proposed the combination *Atichia glomerulosa* (Cohn, *Cryptogamen Flora von Schliessen*, ii. p. 356, 1879).

Ascospores were first found in a species discovered in Java, material being collected by Count Solms-Laubach, and shortly after by Raciborski. A note on Solms' specimens was given by R. Wagner ('00), who remarks that the plant is an Ascomycete pos-

sessing the peculiar structure of *Atichia*. He names it *Atichiopsis Solmsii*, preferring not to link it more closely with Flotow's genus. The full description promised was not published. A few months previous to this, Raciborski, in the third instalment of his notices on Javan fungi, includes a brief account of *A. Millardeti*, sp. nov. ('00, p. 41). He states that the fungus is common in Java on various hosts, and describes the asci, which contained two-celled coloured spores, as occurring in a layer under the surface of special swollen portions of the thallus. His account, though brief, is more detailed than Wagner's, and it was followed some years later by a full description ('09, p. 369). The general structure of the fungus agreed so exactly with *Atichia glomerulosa* that there was no reason to regard it as generically distinct. According to von Höhnelt, Wagner's plant is the same as Raciborski's but his name *Atichiopsis Solmsii* a *nomen nudum*, hence, he states, *A. Millardeti* has priority. Apart, however, from this point, Raciborski's name must stand in preference to Wagner's as it antedates his by a few weeks.*

With the exception of von Höhnelt's paper to be noted immediately the other contributions to our knowledge of the genus have been made by French botanists, who have dealt with it under the name *Seuratia*. This genus was proposed by Patouillard in 1904 for a plant obtained by Seurat in Gambier Islands (Polynesia), and a single species, *S. coffeicola*, was first described. As explained later, this plant is the same as *A. Millardeti*, Rac. *Seuratia* was placed by Patouillard amongst the *Capnodiaceae*, though he notes that it differs from the other genera in several particulars, namely, in the absence of superficial mycelium, the gelatinous consistency, and the peculiar dehiscence. In 1905, however, Vuilleman made it the type of a new family, and at the same time described *S. pinicola* sp. nov. on *Pinus halepensis* in the South of France. This plant is obviously, as von Höhnelt remarks, the ascigerous stage of the original *A. glomerulosa*. The following year Patouillard described another species, from Tahiti, *S. Vanilla*, on leaves of *Vanilla planifolia* ('06). Von Höhnelt's useful paper appeared four years later, though it was preceded by a note in his *Fragmente* ('09, no. 333). In the paper he summarises previous work, points out the identity of *Seuratia* with *Atichia*, and describes *A. Treubii* sp. nov. from material collected by himself in Buitenzorg. Von Höhnelt also removes the Hyphomycete *Heterobotrys paradoxa*, Sacc., to the present genus, and, though he did not apparently see the specimen, proposed the new species *A. paradoxa*.

The latest contribution to the subject is by Mangin and Patouillard ('12), who give for the first time a full and illustrated account of the several reproductive bodies. These authors retain the genus *Seuratia* Pat., but remove the plant previously described by one of them as *S. Vanilla* to a new genus *Phycopsis*, on account of the very distinct manner in which the clusters of conidial cells are produced. They also describe the new species *A. Tonduzi*.

* Raciborski's paper, *Parasitische Algen und Pilze Javas* iii., was received at Kew in July, whereas Wagner's note appeared in the August number of the *Oestr. Bot. Zeit.*

During recent years Saccardo has included these plants in his *Sylloge*, listing first Patouillard's species *Seurattia coffeicola* (= *A. Millardeti*, Rac.) in the supplement which appeared in 1905 (vol. xvii. p. 558). Subsequently he adopted the name *Atichia*, and in a later supplement (vol. xxii. p. 769, Aug. 1913) he records under that name all species which had appeared up to 1910.

STRUCTURE.

The structure of the *Atichia* thallus agrees in a general way with that described for the Dominica plant. The thallus itself is either an irregular wart-like or coralloid mass, or a flattened more or less stellately branched body attached below by a small central point. It is composed of a system of torulose almost articulated filaments held together in mucilage. The filaments branch irregularly and probably anastomose; towards the periphery the branching is dichotomous and the cells smaller and more closely packed, so that a denser cortical layer results. These terminal cells are not, however, laterally united, but remain free as in such an alga as *Nemastoma*. The mucilage is derived from the outer layers of the cell-wall, and the amount present varies considerably in different specimens, being most abundant in old plants. The thallus is colourless within, but externally it is black, owing largely to the peripheral cells being dark in colour.

Three kinds of reproductive organs are known, ascospores, conidia-like cells which adhere in clusters, and pycnidia. With regard to the asci, no definite apothecia or perithecia are produced, but any part of the upper surface of the thallus may become fertile and develop asci between the moniliform filaments in the cortical layer. In some species the fertile portion is swollen in the form of cushion-like pads, which in extreme cases may almost amount to discoid branches. The asci are oval and contain two-celled hyaline or subhyaline spores.* The conidial type of reproduction is even more unusual than the ascigerous. The spores do not occur singly but in clusters, each of which remains intact on liberation, and are produced in great quantities in cavities in the thallus. Mangin and Patouillard, who have carefully worked out the development, term these cell-clusters "propagula," and compare them with the soredia of lichens. There is little doubt that they represent a very abnormal form of conidial development. The propagula themselves are produced in dense masses in the circular or elongated cavities, and are well illustrated in Mangin and Patouillard's paper ('12, Fig. 1). The development of the cells composing the propagulum is remarkable, and consists of successive budding in certain definite directions. The whole thus assumes a characteristic form, which is sufficiently well marked in the different species to afford good specific characters. The genus *Phycopsis*, formed for the reception of *Seurattia Vanillae*, differs

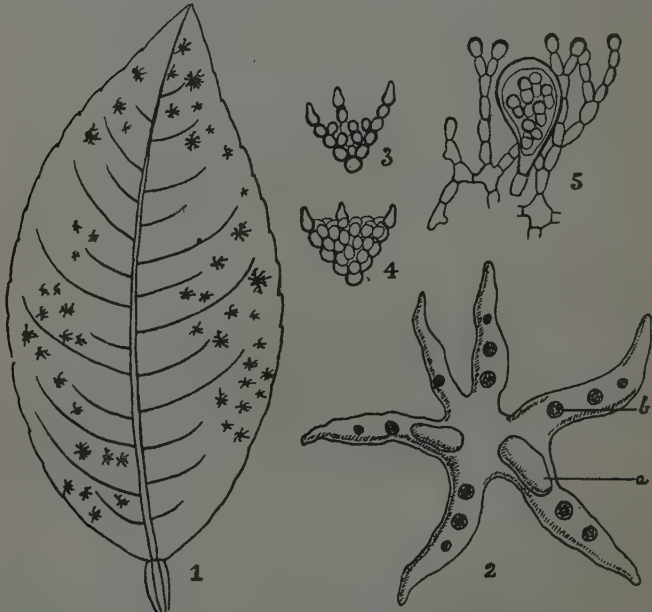
* Raciborski states ('00, p. 41) that the spores of his species are brown, and later ('09, p. 370) that they are (merely) brown-walled ("hellbraunwandig"). An examination of the type-specimens kindly forwarded to Kew by Prof. Raciborski shows that when still in the ascus the spores are practically hyaline, though it is possible that if examined on the spot after natural dehiscence they may be brown-walled.

in the propagula occurring in an isolated manner instead of in dense aggregations. Pycnidia have been described by the above mentioned French authors for *A. Millardeti*. These are found scattered in the thallus on both ascigerous and conidia-bearing plants, and do not show any structural peculiarity.

For specific distinctions the form and size of the thallus have to be noted, but more especially the distribution of the propagula and the arrangement of their component cells. The ascospores vary slightly in size, but otherwise they are singularly constant.

THE DOMINICA PLANT.

On close examination the West Indian specimens were found to be distinct from all species previously described. Though in habit and general appearance they very closely resemble both *A. Millardeti* and *A. Tonduzi*, they differ in the form and arrangement of the propagula. In the former these bodies are produced in oval or elongated cavities, and are triquetrous with terminal hairs; in the latter the cavities are circular and the propagula are irregular or botryoidal in form. The Dominica plant possesses



1. Leaf of *Citrus Medica* with *Atichia dominicana* nat. size.
2. Plant of *A. dominicana* showing irregular swellings containing asci *a*, and conidial cavities *b* $\times 15$.
3. Young propagulum showing the budding off of cells from the 3 primary branches $\times 400$.
4. Mature propagulum $\times 400$.
5. Section through thallus showing peripheral filaments and an ascus $\times 400$.

small round receptacles (Fig. 2) with triquetrous propagula devoid of hairs (Figs. 3 and 4). It had therefore to be described as a new species of which the following is the diagnosis:—

A. dominicana, Cotton; ab *A. Tonduzo*, Mang. et. Pat., triquetris propagulis differt.

Thallus gelatinosus, nigricans, applanatus, stellato-ramosus, contextu ex filamentis torulosis muco immersis constituto, articulis hyalinis ovoideis vel pyriformibus 5–10 μ longis, ultimis fuliginosis minoribus globosis. Rami horizontales, patentes, simplices aut furcati, teretes, fertiles inflato-nodulosi. Asci sub superficie dispositi, in ramis normalibus aut intumescensibus propriis evoluti, 45–50 \times 25–28 μ , sporis hyalinis bicellularibus ovoideis utrinque rotundatis medio constrictis 17–20 \times 8–10 μ . Propagula (conidia in gregos collecta) in corbulis rotundis facie superiore thalli evoluta, triquetra 20–30 μ longa, ex cellulis ovalis 5–6 \times 4 μ composita, absque pila.

Hab. In foliis *Citri Medicæ*, saepe ad scutellis *Lepidosaphes beckii*.

WEST INDIES. Dominica: Senhouse Estate, J. Jones 139.

LIFE-HISTORY AND BIOLOGY.

With regard to the biology of *Atichia* the following items may be recorded. Of the early stages of the plant little is known, but the material forwarded from Dominica supplied a series of specimens showing all stages from the budding propagulum to the mature plant. Some of the leaves received were covered with the mycelium of one of the Sooty Moulds (*Capnodiaceæ*), and on this the propagula had become entangled. In the earliest stages their triquetrous outline is still visible, but owing to successive budding this is soon lost and the mass becomes spherical. When about 50 μ in diameter these masses begin to assume, but on a compressed scale, the same type of structure as the mature plant, and show differentiation into a soft loosely arranged interior, and a denser cortical layer. These observations are important in showing that *Atichia* is a distinct fungus, and not a stage in the life-history of *Capnodium* or other genus as some writers have thought. Proof of this, however, was not needed, as Mangin and Patouillard's researches place the question beyond doubt. The ray-like branches begin to protrude as lateral outgrowths when the plant is quite young (about 1 mm. in diameter), four or five rays first appearing, but others follow so that the mature plant may be 7–10 rayed. The rays, which are of unequal length, often remain simple, but occasionally they fork or produce short lateral branches. A considerable variation in form is thus found, even in specimens occurring close to each other; a point which should inculcate caution with regard to the use of external form in this genus. An even greater variation appears to be displayed by *A. Millardeti* and *A. Tonduzi*.

From what has been said it will be seen that there is no necessary connection between the fungus *A. dominicana* and the scale *Lepidosaphes beckii*, though as a fact it is often found attached to the latter. Some of the lime leaves forwarded were very badly

attacked by this pest, and the effect is seen in the presence of sooty moulds and other fungi. The leaves of Raciborski's specimens are quite clean, and the fungus is sparsely scattered and attached directly to the leaf. The same is also true of some specimens of *A. dominicana*, this being particularly the case in the second batch forwarded.

Raciborski notes an interesting point with regard to the production of spores in *A. Millardeti* ('09 p. 370). He states that the formation of asci appears to coincide with the advent of the East monsoon, whilst during the West monsoon conidia are produced. Evidence of such periodicity is to be seen in the West Indian material. The first batch forwarded (collected November, 1912) was either sterile or contained conidia only; the second gathering (collected in February, 1913) possessed conidia in abundance; whilst in the third supply (collected March 15, 1913), almost every specimen is in full ascigerous fruit, though old conidial cavities are also visible. Seasonal development of spores was also noted by Neger in the plant he examined in Chile (see later).

SYSTEMATIC AND CRITICAL.

As far as fungi that have been described under the name of *Atichia* and *Seuratia* are concerned little revision is necessary, but in order to make the survey of the family as complete as possible, other plants which have been detected as possibly representing species of *Atichia* are considered below, and in most cases the original material has been obtained and examined.

With regard to the plants described by French authors, *Phycopsis Vanillae* is undoubtedly a very marked species and well worthy of the generic rank assigned to it by Mangin et Patouillard. *Seuratia Tonduzi*, specimens of which were kindly sent by Prof. Mangin, is distinct in its large size and botryoidal propagula, but on the grounds of priority it should be known as *Atichia Tonduzi*. The identity of *S. coffeicola*, Pat. with *A. Millardeti*, Rac. had been proved by von Höhnelt, who examined type specimens of both species, but with the publication of fuller details (Mangin and Patouillard, '12) a few points arose which required re-investigation. Prof. Raciborski kindly forwarded a portion of his original material, the examination of which placed the identity of the two plants beyond dispute, the detailed drawings of the French authors agreeing in every particular with the Javan plant.

Various *Hyphomycetes* were next examined. Von Höhnelt pointed out the possibility of *Torula Lechleriana* being a member of the genus, and also *Heterobotrys paradoxa*. In response to a request Prof. P. A. Saccardo was kind enough to send the original specimens on loan to Kew, and also *H. paradoxa* subsp. *chilensis* Sacc. and Syd. The examination of these gave the following results:—

Torula Lechleriana, Sacc. Not an *Atichia*, but apparently rightly placed by Saccardo in the genus *Torula*.

Heterobotrys paradoxa, Sacc. In Sylloge xxii. p. 769, Saccardo suggests that this plant is a synonym of *A. Tonduzi*, whereas von Höhnelt had proposed the name *A. paradoxa* sp. nov. ('10, p. 27). The type shows that it is an *Atichia* and closely allied to *A. glome-*

rulosa. The host-plant, however, is *Euonymus japonicus* and not a conifer, and the material very scanty; hence until collected again and further examined it seems advisable to leave the plant as *A. paradoxa*.

H. paradoxa, subsp. *chilensis*, Sacc. and Syd. The type of this shows a typical *Atichia* structure, but the plant is distinct from *A. paradoxa* in its stellate form. It is allied to *A. Tonduzi*, Mang. et Pat., but differs in the much smaller propagula, which are roughly spherical and measure 14–17 μ diameter. It is apparently distinct from all other species, and may be named *A. chilensis*, sp. nov. The fungus described by Neger ('06) as being a stage in the life-history of *Antennaria scoriadea*, and alluded to by von Höhnelt, must be referred to here. The description of the gelatinous star-shaped bodies, and of the clusters of spores comparable to those of *Coniothecium* was strongly suggestive of the present genus. Prof. Neger favoured Kew with the loan of authentic material, and from this it is evident that the plant is not *A. chilensis*, as might have been supposed, but a distinct and probably new species having the habit of *A. glomerulosa* but with different and larger propagula. The propagula are very scarce in the material forwarded, and insufficiently developed for a more definite statement to be made.

Two other fungi, or rather two other forms in the so-called life-history of certain species, should likewise be placed in *Atichia*. The species of *Capnodium* described by Bernard ('07) have been the subject of comment by more than one writer. Thus Vuilleman (*Comptes rendus*, t. 146, p. 307), rightly points out that certain fungi described by him as stages in *Capnodium stellatum*, Bern., and *C. javanicum*, Zimm., are entities, and clearly represent *Seurattia*. The type specimens of these two plants are at Buitenzorg and have not been examined. Being Javan plants one would be inclined to refer them to *A. Millardeti*, which Raciborski states is a frequent epiphyte in that region, but the propagula suggest rather *A. Tonduzi*, though they do not entirely agree with that species. These two plants must be left for future enquiry, as from the description and figures it is not possible to determine their specific identity.

Saccardo's suggestion (*Syll.* xxii. p. 769), that his genus *Actinonomma* may possibly find a place here has not been investigated, as the Kew specimens are insufficient for the purpose; but the presence of numerous hairs on the thallus is not in agreement with the plants we have been considering, and indicates a different affinity. This concludes the survey of the *Atichia*-like fungi. It is possible that other species or spore-forms which have been described will ultimately be found to belong to the present genus, but the above includes all those that have so far been detected.

With regard to the position of the genus great difference of opinion has existed. After its removal from the *Collemaceae* it was placed in a special family next to the *Myriangiaceae* by Raciborski, in the *Capnodiaceae* by Patouillard, in the *Saccharomycetes* by von Höhnelt, whilst Vuilleman regarded it as the type of a distinct family in the *Perisporiales*. Though not closely allied to any other family this is perhaps the most convenient position

in which to place it, but the name *Atichiaceae* rather than *Seuratiaceae* should be adopted. It is sharply defined by the gelatinous thallus, by the absence of ordinary mycelium and true apothecia, and by the remarkable propagula. Mangin and Patouillard are of opinion that the absence of mycelium is sufficiently important to warrant the separation of *Atichia* from other *Ascomycetes*. They regard the family as an autonomous type parallel to the filamentous *Ascomycetes*, and they suggest that it represents an abortive offshoot of the *Florideae*.

CONSPECTUS OF SPECIES OF ATICHIACEAE.

1. **Phycopsis Vanillae**, Mang. et Pat. in Comp. Rend. cliv. p. 1480, fig. 2. *Seuratia Vanillae*, Pat. in Bull. Soc. Myc. xxii. p. 54, pl. i., fig. 4. *Atichia Vanillae*, von Höhnelt in Ann. Jard. bot. Buitenzorg, 1910, Supp. iii. p. 27 (ex errore *vanillicola*).

POLYNESIA: Tahiti. On leaves of *Vanilla planifolia*.

Distinguished from *Atichia* by the scattered propagula.

2. **Atichia glomerulosa**, Stein in Cohn Crypt. Flora ii. part 2, p. 356; von Höhnelt, l.c., p. 19. *Collema glomerulosum*, Ach. Lich. Univ. p. 641. *Synalissa glomerulosa*, Nyl. Enum. Lich. p. 88. *Atichia Mosigii*, Flot. in Linnaea xxiii. p. 150; Millardet in Mem. Soc. sci. nat. Strassb. vi. p. 60, 3 tab. *Hyphodictyon lichenoides*, Millardet in Act. Soc. Helv. 1866, p. 85. *Seuratia pinicola*, Vuilleman in Bull. Soc. Myc. xxi. p. 74, pl. 4.

S. EUROPE. On leaves and shoots of *Picea* and other conifers.

3. **A. paradoxa**, von Höhnelt, l.c., p. 27. *Heterobotrys paradoxa*, Sacc. Michelia ii. p. 124.

FRANCE: Rouen. On leaves of *Euonymus japonicus*.

This species is insufficiently known and may be a synonym of the last.

4. **A. Millardeti**, Rac. in Bot. Inst. Buitenzorg, 1900, p. 41; in Bull. de l'Acad. Sci. Cracovie, 1909, p. 369; von Höhnelt, l.c. p. 27. *Atichiopsis Solmsii*, R. Wagn. in Oestr. Bot. Zeitschr. L. p. 304. *Seuratia coffeicola*, Pat. in Bull. Soc. Myc. xx. p. 136, fig. 1; *ibid.*, xxii. p. 53; Mang. et Pat. in Comp. Rend. cliv. p. 1477, fig. 1 (cf. *Capnodium stellare*, Bern. in Bull. Dept. Ag. Ind. Néerl. No. xi. pp. 1-24).

MALAYA: Java. POLYNESIA: Gambier Islands and Tahiti. On leaves of *Coffea arabica*, *Styrax Benzoin*, *Cinnamomum zeylanicum* and other plants.

This species is easily distinguished by the three hairs on the triquetrous propagula.

5. **A. Treubii**, von Höhnelt, l.c. p. 27.

MALAYA: Java. On leaves of *Ficus elastica*.

A very minute species and probably easily overlooked.

6. **A. Tonduzi**, comb. nov. *Seuratia Tonduzi*, Mang. et Pat. l.c. p. 1480, fig. 1.

CENTRAL AMERICA: Costa Rica. On *Anthurium* sp.

A fine large species distinguished by the irregular globose or botryoidal propagula, which may be 30-35 μ across.

7. *A. dominicana*, sp. nov.

WEST INDIES: Dominica. On leaves of *Citrus Medica*.

Distinguished by the small triquetrous propagula devoid of hairs.

8. *A. chilensis*, comb. nov. *Heterobotrys paradoxa*, subsp. *chilensis*, Sacc. et Syd. in Ann. myc. ii. p. 172. *Antennaria scoriadea* Berk., Neger in Bakt. Centr., ii. p. 613 (*p.p., non alibi*).

CHILE: Villarica. On leaves of various plants.

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X.—ENUMERATION OF T. A. SPRAGUE'S SOUTH AMERICAN PLANTS: GAMOPETALAE.

H. F. WERNHAM.

The plants enumerated in the present paper were collected during the course of an expedition through Venezuela and

Colombia in 1898-99 (*see* Trans. Bot. Soc. Edin. xxii. pp. 425-434).

The Polypetalae were worked out by the collector, but only diagnoses of the new species were published, as it was intended that the list of plants collected should appear as a whole. It has now been decided to publish the enumeration in parts, and the present instalment, comprising the *Rubiaceae*, will be followed by others, including the Polypetalae and the remainder of the Gamopetalae.

RUBIACEAE.

Joosia umbellifera, *Karst.* Flor. Columb. i. 9, t. 5 (1858).

COLOMBIA. San Martin District: Villavicencio, fl. Jan. *Sprague* 134. Small tree with white flowers.

Distrib. Colombia and Peru.

Manettia coccinea, *Griseb.* Fl. Br. W. Ind. 329. A form with 4 calyx-lobes instead of 8.

COLOMBIA. San Martin District: Villavicencio, fr. Jan. *Sprague*.

Distrib. Central America, West Indies, Guiana, and Western tropical South America.

Manettia coccocypseloides, *Wernham*; *affinis M. racemosae*, Ruiz et Pav., a qua floribus paucioribus minoribus, forma calycis corollaeque distinguitur.

Herba debilis scandens, caule sparse et obscure puberulo subnitente; *foliis* lanceolatis vel ovato-lanceolatis, circiter 4.5 cm. \times 1.7 cm., acuminatis acutissimis, utrinque sparsiuscule griseo-puberulis, petiolo brevi ad 8 mm. longo; *stipulis* parvis late ovatis; *floribus* albis circiter 1 cm. longis in cymis corymbosis paucifloris, pedunculo vix 1.5 cm. longo qua ramuli et pedicelli graciles ad 5 mm. sparsiuscule puberulo; *bracteis* ovalibus mucronatis ad circiter 5 mm. \times 2.5 mm. ut folia indutis; *calycis* lobis 4 lineari-oblongis, 3-4 mm. longis; *corolla* extra puberula inter minimas tubo gracili insuper leniter nec multo ampliato demum glabrescente; *capsula* subglobosa sparse puberula tardius glabrescente.

COLOMBIA. Tolima: Pitalito, fl. and fr. March, *Sprague* 244.

A delicate little herb, allied to the Venezuelan *M. racemosa*, but readily distinguished by the much smaller flowers fewer together, and the differently shaped calyx and corolla.

Sipanea acinifolia, *Spruce ex Sprague* in Trans. & Proc. Bot. Soc. Edin. xxii. 433 (1904).

VENEZUELA. Caicara, Orinoco, in savanna near a clump of Moriche palms, fl. Nov. *Sprague* 7.

Distrib. Lower Orinoco and Lower Amazons. The only other known specimen was collected at Santarem by Spruce. Sprague's specimen seems to have abnormally large flowers, and may possibly be a variety.

Limnosipanea palustris, *Hook. f.* Ic. Pl. t. 1050. *Sipania palustris*, Seem. Bot. Herald, 136 (1852).

COLOMBIA. Cabuyaro, Rio Meta, fr. Jan. *Sprague* 57.

Distrib. Panama and Colombia.

Oldenlandia herbacea, DC. Prodr. iv. 425 (1830).

COLOMBIA. Cabuyaro, Rio Meta, edge of wood, fr. Jan. *Sprague* 28.

Distrib. Fairly general throughout the tropics.

Isertia Spraguei, Wernham; affinis *I. Purdiei*, Sprague, a qua corollae forma ac indumento differt.

Arbor ramulis sulcatis sparsiuscule minute asperulo-pubescentibus; *foliis* 26–38 cm. × 12–16 cm. ellipticis vel elliptico-oblongis, brevissime leniterque acuminatis obtusis, supra glabris subnitentibus, subtus inter venas minute griseo-tomentosis, in costa media prominente venisque secundariis utrinque ad 25 tenuibus siccitate nigricantibus necnon in reticulo interveniente conspicuo tamen tenui obscure minutissime pubescentibus; *petiolo* subterete similiter induto ad 5.5 cm. nonnunquam longiore; *stipulis* fere ad basin in partibus triangulari-lanceolatis acuminatis acutis rigidiusculis 1–1.5 cm. longis saepe distantibus divisis; *inflorescentia* subpyramidalis thyrsioidea ramulis sparse in axillis densius pubescentibus tandem deflexis; *calycis* glabri limbo integerrimo brevissimo; *corollae* tubo extra sparse minute pubescente 4–4.5 cm. longo, insuper leniter usque ad in ore 1.2 cm. lato ampliato, lobis ovalibus apice rotundatis 1.1 cm. × 6 mm.; *stilo* pubescente, *stigmatibus* 2 glabris suborbicularibus; *baccis* glabris bilocularibus.

COLOMBIA. Eastern Cordilleras between Pitalito (Tolima) and ratis suborbicularibus; *baccis* glabris bilocularibus.

Isertia alba, *Sprague* in Trans. & Proc. Bot. Soc. Edin. xxii. 434 (1905). By a clerical error the wrong specimen and locality were quoted for this species. The correct data are now given.

PERUVIAN AMAZONS. Yurimaguas, Huallaga River, in secondary forest, fl. May, *Spruce* 3878.

Gonzalea tomentosa, *Humb. et Bonpl.* Pl. Aeq. i. 225, t. 64 (1808).

COLOMBIA. Tolima: San Augustin, fl. March, *Sprague* 297.

Distrib. Western Tropical South America.

Sabicea camporum, *Sprague* in Trans. & Proc. Bot. Soc. Edin. xxii. 434 (1904).

COLOMBIA. Cabuyaro, Rio Meta, fl. Jan. *Sprague* 43.

Hamelia lutea, *Rohr. ex Smith* in Rees, Cycl. v. 17, n. 4 (1811).

COLOMBIA. Caquetá District: San José, Rio Putumayo, fl. and fr. Aug. *Sprague* 611. Flowers yellow.

Distrib. Generally in tropical America.

Hamelia patens, *Jacq.* Stirp. Amer. 72, t. 50 (1763).

COLOMBIA. San Martin District: Villavicencio, fl. Jan. *Sprague* 110.

A glabrescent form (see Wernham, Journ. Bot. 1911, xlix. 214), with minutely scabrid leaves.

Distrib. Tropical America, Mexico, and Paraguay.

Bertiera guianensis, *Aubl.* Pl. Guian. i. 180, t. 69 (1775).

COLOMBIA. San Martin District: Villavicencio, fl. and fr. Jan. *Sprague* 91.

Distrib. Generally in tropical America.

Alibertia pedicellata, Wernham; floribus in racemulo abbreviato valde bracteato dispositis distincta.

Arbor glabra ramulis rectis cortice striato; *foliis* pergamentaceis oblanceolatis ad obovatis vel ellipticis 16–20 cm. \times 5.5–8.5 cm., utrinque angustatis, venis secundariis utrinque circiter 10 subtus qua centralis supra impressa prominentibus, reticulo tertiariorum valde conspicuo, petiolo 1–1.5 cm. glabro; *stipulis* late oblongo-triangularibus cuspidatis ad 5 mm. \times 7–8 mm.; *floribus* in racemulo abbreviato 1–1.5 cm. longo dispositis; *bracteis* et *bracteolis* triangularibus subacutis ad 5 mm. \times 3 mm. concavis; *pedicellis* minutissime pubescentibus griseo-furfuraceis fructu ad 6–7 mm. accrescentibus; *bacca* ellipsoidea glabra 2.5 cm. longa 1.8 cm. lata a calycis limbo dentibus 5 brevibus latis subacutis coronata.

COLOMBIA. Caquetá District: Mocoa, fr. May, *Sprague* 362; *Triana* 1833.

Remarkable for the characters of the inflorescence—especially the pedicels.

Duroia Spraguei, Wernham; affinis *D. hirsutae*, K. Schum., a qua floribus solitariis multo hispidioribus recedit.

Arbor; *foliis* validiuscule pergamentaceis late oblanceolatis ad circiter 23 cm. \times 10 cm., basin versus angustatis petiolo hispido circiter 1.5 cm. longo, apice cuspidatis acutis acumine vix 1.5 cm. excedente, supra sparsiuscule in venis hispido-hirtis, subtus in venis conspicuis centrali valde prominente dense secundariis sparsius utrinque circiter 15 hispidis, margine ciliato, aliter hirtellis ad glabratibus; *floribus* subsolitariis; *calycis* dense sericeo-hispidi lobis subulato-setaceis alabastro ad 8–9 mm., tubo circiter 5 mm.; *corolla* extra sericea; *ovario* ellipsoideo densissime longe sericeo-hispidissimo, alabastro 1.3 cm. \times 8 mm.

COLOMBIA. Caquetá District: Mocoa, *Sprague* 369; *Triana*.

Approaches *D. hirsuta*, K. Schum., but differs in the relatively broader leaves with longer stalks and shorter, more cuspidate acumen; and in the solitary, much more hispid, and larger flowers. Native name: "Taruquillo."

Posoqueria Spraguei, Wernham; affinis *P. decorae*, DC., a qua corollae tubo multo longiore et calycis dentium forma recedit.

Frutex glaberrimus ramulis tetragonis; *foliis* ovalibus ad circiter 25 cm. \times 12 cm. brevissime acuminatis apice acutissimo; *petiolo* brevissimo 1 cm. vix attingente; *stipulis* primo triangularibus demum ovatis basin versus constrictis vix connatis nec vaginantibus apice obtuso circiter 2.2 cm. \times 1.3 cm.; *inflorescentia* pauciflora, *pedicellis* ad 1 cm. longis; *calycis* dentibus triangularibus obtusis circiter 1.5 mm. \times 1.5 mm.; *corollae* tubo angustissimo longissimo 23 cm. excedente latitudinem 3 mm. nec attingente insuper vix ampliato, lobis oblongis obtusis ad 3.5 cm. \times 5 mm.; *antheris* dorso puberulis oblongis circiter 7 mm. longis, filamentis ad 1 cm. exsertis.

COLOMBIA. Caquetá District: San José, in a creek of the River Putumayo, fl. Aug. *Sprague*.

A very distinct species, its nearest ally being *P. decora*, DC., from which it differs especially in the much longer corolla-tube and differently-shaped calyx-teeth.

Geophila reniformis, *D. Don*, Prodr. Fl. Nep. 136.

COLOMBIA. Caquetá District: Mocoa, *Sprague* 404.

Distrib. Generally throughout the tropics.

Cephaelis sp.

COLOMBIA. Caquetá District: Mocoa, fr. May, *Sprague* 378. Tree 5 m. high, 12.5 cm. in diameter. Probably a *Cephaelis*; cannot be described in the absence of flowers.

Psychotria acuminata, *Benth.* Bot. Sulph. 107 (1844).

COLOMBIA. Caquetá District: Mocoa, *Sprague* 405.

Distrib. Colombia. A broad-leaved variety has been found in Nicaragua.

Psychotria Spraguei, *Wernham*; similis *P. trichocephalae*, Poepp. et Endl., a qua calycis segmentis elongatis et indumento foliorum differt; ab affini *P. horridula*, Muell. Arg., inflorescentia multiflora distinguitur.

Frutex; *foliis* lanceolatis vel anguste oblongis circiter 12–15 cm. × 3.5–4.5 cm. utrinque angustatis subacutis acuminatis utrinque praesertim subtus in venis densiuscule hispidis olivaceo-viridibus, petiolo circiter 1.5 cm. hispidissimo; *stipulis* ovatis insuper bifidis subulato-caudatis rigidis ad 2.5 cm. longis; *inflorescentia* subcapitata multiflora; *bracteis* bracteolisque extra pilis articulatis hispidissimis indutis lanceolatis ad linearibus apicibus setaceis exterioribus nonnunquam ovatis subtrilobatis; *calycis* limbo fere ad basin in lacinias 5 lineares diviso flore 2–3 mm. fructu ad 4.5 mm. accrescentibus; *corollae* tubo gracili 5 mm. extra subglabro, lobis triangularibus subacutis 1–1.5 mm. extra dense barbatis; *bacca* ellipsoidea hispida calycis limbo persistente coronata.

COLOMBIA. Tolima: San Augustin, fl. and fr. March, *Sprague* 304. Also collected by *Triana* 1708; Ocaña, *Purdie*; *Kalbreyer* 1055.

This species bears a superficial resemblance to *P. trichocephala*, Poepp. et Endl., but there is a fundamental difference in the elongated calyx-segments of the present species, and the leaf-indumentum is quite distinct. The nearest affinity seems to be with the Brazilian *P. horridula*, Muell. Arg., which has a 2-3-flowered inflorescence, and differently-shaped leaves and stipules.

Psychotria bertieroides, *Wernham*; affinis *P. flexuosae*, K. Schum., a qua corolla distinguitur.

Frutex glaber ramulis quadrangularibus; *foliis* ellipticis 16 cm. × 6 cm. ad 22 cm. × 9 cm. utrinque angustatis apice acutis, petiolo 2–2.5 cm. longo venis secundariis utrinque 10; *stipulis* binis infra in vagina ad circiter 2.5 mm. alta connatis supra in aristis duabus rigidescens 3 mm. longis 3.5 mm. distantibus productis; *inflorescentia* thyrsioidea laxa circiter 11 cm. × 6 cm., pedunculo 6–7 cm. longo, cymulis dichotomis subunilateralibus, floribus 4–meris subsecundis distantibus sessilibus 4–5 mm. longis; *bracteis* obsoletis; *calyce* minimo puberulo minute dentato; *corolla* extra minutissime sparsim pubescente vel glabrescente insuper infundibulari lobis oblongis patentibus obtusis vix 1 mm. longis; *bacca* pisiformi costata glabra.

COLOMBIA. Caquetá District: Mocoa, fl. and fr. May, *Sprague* 386.

Recalls *Bertiera parviflora* in the inflorescence and leaf-shape. The nearest species is, perhaps, *P. flexuosa*, K. Schum, but the two are readily distinguished by the characters of the corolla.

Psychotria tolimensis, *Wernham*; affinis *P. anomothyrsae*, K. Schum., a qua inflorescentia differt.

Frutex glaber ramulis subfistulosis; *foliis* oblongo-lanceolatis vel oblanceolatis ad circiter 23 cm. \times 6-6.5 cm. apicem subacutum versus leniter acuminatis basi in petiolum subalatum 2-3 cm. longum angustatis; *stipulis* parvis triangularibus caducissimis; *inflorescentia* thyrsioidea laxa circiter 3 cm. \times 2.5 cm., pedunculo 3-3.5 cm. axillari ramulis complanatis bracteis inconspicuis; *calycis* minimi limbo subintegro; *corolla* glabra alba angusta superne vix ampliata 5-6 mm. longa.

COLOMBIA. Tolima: Pitalito, fl. March, *Sprague* 237. Also collected by *Triana* 1707.

Near *P. anomothyrsa*, K. Schum, from which it differs in the extent of the inflorescence.

Psychotria cabuyarensis, *Wernham*; foliis magnis obovatis, stipulis rotundatis conspicue acuminatis, inflorescentia magna diffusa facile distinguitur.

Arbor 3 m. alta, glabra; *foliis* obovatis 26-31 cm. \times 9-12 cm. apicem subacutum versus parum acuminatis desuper in basin leniter angustatis petiolo brevissimo vel obsoleto venis secundariis utrinque circiter 15 conspicuis; *stipulis* integris late ovatis 1.7 cm. \times 1.7 cm. caudato-acuminatis acutissimis; *inflorescentia* maxima thyrsioidea laxa ramis divaricatis in fructu ad 13 cm. \times 20 cm. accrescente pedunculo valido 19-20 cm. longo; *bracteis* minutiusculis caducis; *floribus* albo-viridibus; *bacca* glabra ovoidea 8-9 mm. \times 3-4 mm.

COLOMBIA. Cabuyaro, Rio Meta, in forest south of river, fr. Jan. *Sprague* 154. Collected also by *Barclay* 739, on loam soil in moist woods of St. Francis Esmeraldas.

A very distinct species, readily identified by the large obovate leaves, the broad, rounded stipules with sharply-marked acumen, and the very extensive and diffuse inflorescence.

Psychotria alibertioides, *Wernham*; affinis *P. granadensi*, Benth., a qua calyce multo majore distinguitur.

Frutex glaber ramulis subteretibus validis; *foliis* pergamentaceis obovatis ad 14-15 cm. \times 6.5-7 cm. breviter acuminatis obtusis basi acutis petiolo valido 5-8 mm. longo supra demum argenteo-griseis venis secundariis utrinque 9-12 subtus prominentibus; *stipulis* oblongis apice rotundatis circiter 1 cm. \times 3.5 mm., parte inferiore paulum persistente mox tamen deciduis; *inflorescentia* umbellata 2-3-chotoma 7-10-flora pedunculo brevi tota vix 3 cm. \times 2.5 cm.; *calycis* limbo circiter 2.5 mm. longo 6 mm. lato obscuriuscule dentato; *corollae* albae glabrae tubo late cylindraceo 1.3 cm. \times 4.5 mm. (ore) lobis 5 oblongis obtusis 4.5 mm. \times 1.8 mm.

COLOMBIA. Caquetá District: San José, R. Putumayo, fl. Aug. *Sprague* 602.

Near *P. granadensis*, Benth., but the calyx in our species is much larger.

***Palicourea crocea*, Roem. et Schult.** Syst. v. 193.

COLOMBIA. Tolima: San Augustin, fl. and fr. March, *Sprague* 282. Flowers orange.

Distrib. Tropical America and Paraguay.

***Palicourea augustifolia*, H. B. et K.** Nov. Gen. et Sp., iii. 367.

COLOMBIA. Between Villavicencio and Bogotá, *Sprague*.

Distrib. Colombia and Venezuela (banks of Orinoco and Rio Negro).

***Palicourea caerulea*, Roem. et Schult.** Syst. v. 194.

COLOMBIA. San Martin District: Villavicencio, fl. and fr. Jan. *Sprague* 90.

Distrib. Western Tropical South America.

***Palicourea dorantha*, Wernham;** affinis *P. calycinae*, Benth., a qua stipulis et inflorescentiae magnitudine differt.

Arbor 6 m. alta, caule 6-7.5 cm. diametro; *foliis* ellipticis utrinque breviter acuminatis subacutis circiter 20 cm. × 8.5 cm. utrinque nisi subtus in venis sparsissime pilosis glabris venis secundariis utrinque circiter 12-15 subtus prominentibus petiolo glabro ad 3 cm. longo; *stipulis* in vagina 1 cm. alta connatis, partibus liberis 1.5 cm. vel longioribus; *inflorescentia* laxa thyrsoides circiter 18 cm. × 12 cm., pedunculo valido glabro 7-8 cm. longo; *bracteis* parvis ad 8 mm. × 3 mm. oblongo-lanceolatis; *calycis* segmentis latis rotundatis circiter 2 mm. × 2.5 mm. imbricatis; *corolla* inter maximas infundibulari-cylindracea fere 2 cm. longa, ore 7 mm. lata extra dense velutine tomentosa, lobis brevibus latis rotundis.

COLOMBIA. Eastern Cordilleras, between Pitalito (Tolima) and Mocoa (Caquetá District), fl. April, *Sprague* 345.

The nearest ally seems to be *Palicourea calycina*, Benth., but the present species is distinct in the character of the stipules and size of the inflorescence.

***Mapouria alba*, Muell. Arg.** in Flora, 1876, 458.

COLOMBIA. Tolima: San Augustin, fl. and fr. March, *Sprague* 307. A small tree, 4.5-6 m., with whitish flowers and red fruits.

Distrib. Western Tropical South America, Brazil, and Paraguay.

***Mapouria micrantha*, Wernham,** comb. nov. *Psychotria micrantha*, H. B. et K. Nov. Gen. Sp. Pl. iii. 363, t. 284 (1818).

COLOMBIA. Caquetá District: Mocoa, fl. and fr. May, *Sprague* 400.

Distrib. Western Tropical South America.

***Emmeorrhiza umbellata*, K. Schum.** in Fl. Bras. VI. vi. 408. *Endlicheria umbellata*, K. Schum., l.c. 38; necnon synonyma alia.

COLOMBIA. Tolima: San Augustin, fl. and fr. March, *Sprague* 321.

Distrib. Widely distributed over the tropics of South America and extending into Paraguay.

XI.—SARCANTHUS OXYPHYLLUS.

R. A. ROLFE.

The identity of *Sarcanthus oxyphyllus*, Wall., has never been satisfactorily established, though the late Sir J. D. Hooker referred to it a specimen collected at Moulmein by Parish. He, however, mentioned a so-named drawing at Calcutta, which to him suggested some misapplication of the name by Lindley or Wallich. Owing to the necessity of identifying the plant, the matter was referred to Major A. T. Gage, I.M.S., Superintendent of the Royal Botanic Garden, Calcutta, who informs us that there is no original Wallichian drawing at Calcutta, but there is a record in a catalogue of the Calcutta Botanic Garden which enables the plant to be identified.

Lindley, in 1840 (Bot. Reg. xxvi. Misc. p. 58), mentions *Sarcanthus oxyphyllus*, Wallich MSS., as follows: "This plant, which has been lately received from Calcutta by several persons, has flowered in the garden of the Horticultural Society, and proves to be nothing more than a narrow-leaved variety of *Sarcanthus rostratus*, a species of no beauty, long since introduced by the Horticultural Society from China." The habitat of the plant is not stated, and, unfortunately, the specimen alluded to is not preserved in Lindley's Herbarium. Reichenbach, however, who in 1855 obtained a specimen from Consul Schiller, which the latter had received direct from Calcutta (Otto and Dietr. Allg. Gartenz. xxiii. p. 331), indicated the plant as distinct from *S. rostratus*, Lindl., and it is now evident that this view is correct.

The only specimen of *S. oxyphyllus* cited by Sir J. D. Hooker (Fl. Brit. Ind. vi. p. 70) is Moulmein, Parish, a plant collected long after Wallich's time, to which alone his remark applies that the species is very nearly allied to *S. pugioniformis*, Reichb. f. He also cites, somewhat doubtfully, as synonymous *Cleisostoma subulatum*, Blume, and *Angraecum pugioniforme*, Klotzsch, the former a Javan plant, afterwards called *Sarcanthus subulatus*, Reichb. f., the latter from Venezuela, now known as *Campylocentrum pugioniforme*, Rolfe.

The Calcutta drawing above-mentioned is reproduced by Sir J. D. Hooker under the name of *Sarcanthus secundus*, Griff., in Ann. R. Bot. Gard. Calc. v. p. 51, t. 77, and on p. 52 the note occurs: "The drawing here reproduced is inscribed '*Sarcanthus oxyphyllus*, Wall.' in Wallich's handwriting; to which is added 'Duphla Hills, Mr. Lister, Fld., June, 1875' (it is 1878 on the Kew copy)." The phrase "in Wallich's handwriting" is obviously incorrect, and is probably that of Dr. King.

Wallich's Herbarium, now at Kew, throws no light on the matter, though his number 7321 includes specimens of *Sarcanthus secundus*, Griff. This number comprises three species, of as many different genera: (1) the type of *Micropera pallida*, Lindl. (Gen. & Sp. Orch. p. 219), collected in E. Sylhet by F. de Silva; (2) *Sarcanthus secundus*, Griff., collected in Sylhet in August, 1831, by W. Gomez (the other name cited by Wallich); and (3) *Saccolabium ramosum*, Lindl., collected in the Loam Mountains in May, 1830 (collector not stated). The latter is not cited by

Wallich (Cat. n. 7321), and may not have been included by him, though both it and a second specimen of *Sarcanthus secundus* from another source bear the number 7321 on the sheet (not on the labels).

J. J. Smith (Orch. Jav. p. 604) cites *Sarcanthus secundus*, Griff., as a synonym of *S. subulatus*, Reichb. f., under which he includes the Indian plant, which is now considered to be quite distinct.

Lastly, Ridley, who in his Mat. Fl. Mal. Penins. i. p. 168, transfers *Sarcanthus secundus* to *Saccolabium*, also applies the name to the Malayan plant, which he cites as occurring from Assam to Borneo, but he expressly excludes Ann. R. Bot. Gard. Calc. viii. p. 241, t. 331, which is true *Sarcanthus secundus*, Griff. The latter shows how completely the name has been confused.

We now return to the original *Sarcanthus oxyphyllus*, Wall., and the record kindly furnished by Major A. T. Gage. According to a catalogue of the Hon. East India Company's Botanic Garden at Calcutta, 1794-1840, vol. iii. p. 1985, Wallich based his *S. oxyphyllus* on "Khasia, W. Gomez, 1821, and Assam, W. Griffith," thus confirming the record that it is identical with the later *S. secundus*, Griff. King and Pantling (Ann. R. Bot. Gard. Calc. viii. p. 241, t. 321) adopt the later name, adding, however, "Griffith's name is inappropriate, as the flowers are not secund," and although Griffith gave the name in reference to the leaves the character does not always apply, and the clearing up of the confusion suggests the desirability of returning to the earlier and fully appropriate name. In view of the above facts the suggestion of some misapplication of the name *S. oxyphyllus* by Lindley or Wallich is seen to be untenable.

The species of *Sarcanthus* closely allied to *S. oxyphyllus* form a natural group, and are as follows:—

S. oxyphyllus, Wall. ex Lindl. Bot. Reg. xxv. Misc. p. 58 (1840); Reichb. f. in Otto & Dietr. Allg. Gartenz. xxiii. p. 331 (1855) (not of Hook. f.). *S. secundus*, Griff. Notul. iii. p. 362 (1851); Ic. Pl. Asiat. t. 336; Hook. f. in Ann. R. Bot. Gard. Calc. v. p. 51, t. 77; King & Pantl. l.c. viii. p. 241, t. 321. *Micropera pallida*, Wall. Cat., n. 7321 (1828), in part (not of Lindl.).—Native of Sylhet, Assam, Khasia, Chittagong, Duphla Hills and Sikkim.

S. peninsularis, Dalz. in Hook. Kew Journ. Bot. iii. p. 343 (1851). *S. pauciflorus*, Wight Ic. t. 1747 (1852). *Saccolabium acuminatum*, Thwaites Enum. Pl. Ceyl. p. 304 (1861).—Native of the Deccan Peninsula, from the Concan to Travancore, and Ceylon, in the Saffragam district.

S. subulatus, Reichb. f. in Bonplandia, v. p. 41 (1857); J. J. Sm. Orch. Jav. p. 604. *S. pugioniformis*, Reichb. f. in Otto & Dietr. Allg. Gartenz. xxiv. p. 219 (1856), excl. syn. *S. oxyphyllus*, Hook. f. Fl. Brit. Ind. vi. p. 70 (1890) (not of Wall.). *Saccolabium secundum*, Ridl. Mat. Fl. Mal. Penins. i. p. 168 (1907). *Cleisostoma subulatum*, Blume Bijdr. p. 363 (1825).—

Native of Moulmein, Cochin China, the Malay Peninsula, Java, Sumatra and Borneo.

S. dealbatus, *Reichb. f.* in Walp. Ann. vi. p. 892 (1864).
Cleisostoma dealbatum, Lindl. Bot. Reg. xxix. Misc. p. 5 (1843).
 —Native of the Philippines.

It may be added that there is a slight doubt as to whether the references cited under *Sarcanthus subulatus* all belong to the same species. Reichenbach considered the Javan *S. subulatus* as distinct from *S. pugioniformis*, of which latter the habitat was not known, though he cited the Venezuelan *Angraecum pugioniforme*, Klotzsch, which is not a *Sarcanthus*, as synonymous. There is, however, in Lindley's Herbarium a dried specimen and coloured drawing from "Borneo, J. Moon, 8 Feb., 1847," which Lindley has labelled "*Cleisostoma subulatum*, Blume," to which Reichenbach has added, "vid. *Sarcanth. pugionif.*, Rb.f." I have not seen the Javan plant, but J. J. Smith indicates it as identical with the Bornean one.

XII.—FUNGI EXOTICI: XVII.

All the specimens described were collected by Mrs. Burkill in the Botanic Gardens, Singapore, and were accompanied by coloured drawings and notes prepared by the collector.

The genus *Boletus* appears to be especially well represented, 24 new species have already been described from the Singapore Gardens, and there is evidence of the existence of more, which can be dealt with on some future occasion when better material may be available.

AGARICACEAE.

Lepiota albida, *Massee*.

Pileus membranaceus, primo subglobosus dein explanatus, umbonatus, margine striatulus, albidus, 3-4 cm. latus. *Lamellae* liberae, confertiusculae, albae. *Stipes* sursum attenuatus, fistulosus, candidus, glaberrimus, albidus, facile a pileo secedens, 4-6 cm. longus, 4-5 mm. crassus; annulus adnatus, persistens. *Sporae* ellipticae, hyalinae, $6 \times 3.5 \mu$.

SINGAPORE. Among nests of black Termites, *E. M. Burkill* 219.

Differs from *L. erminea* in the persistent ring and smaller spores.

Schulzeria pellucida, *Massee*.

Pileus tenuissimus, translucens, sulcato-plicatus, opalinus, pulvere sulfureo adpersus, 3-4 cm. diametro. *Lamellae* liberae, subdistantes, latae, antice acutae, albae. *Stipes* sursum attenuatus, basi inflatus, fistulosus, pallidus, squamulis sulfureis ornatus, 8-12 cm. longus, 3-4 mm. crassus. *Sporae* oblique ellipsoideae, hyalinae, laeves, utrinque apiculatae, $12-14 \times 9-10 \mu$.

SINGAPORE. Under trees amongst fallen leaves, *E. M. Burkill* 101.

The general aspect is that of a *Bolbitius*, but the spores are colourless, and the gills free from the stem.

Collybia elata, Massee.

Pileus hemispherico-explanatus, glaber, in sicco rugulosus, margine acuto integro, flavo-brunneus, umbone versus saturatior, 5-6 cm. latus. *Lamellae* adnexae, antice rotundatae, confertae, albiae. *Stipes* rectus, sursum gradatim attenuatus, fistulosus, extus fibrillosus, pallidus, 8-10 cm. longus, 0.8-1 cm. crassus. *Sporae* globosae, hyalinae, basi apiculatae, 7-8 μ diametro.

SINGAPORE. On the ground in the jungle, *E. M. Burkill* 150.

C. elata is allied to *C. radicata*, but may be distinguished by the globose spores, and the absence of a long rooting base to the stem.

Clitocybe carnosa, Massee.

Pileus valde carnosus, convexus, sericeo-fibrillosus, concentric squamulosus, aetate plus vel minus rimosus, albidus, 4-5 cm. latus. *Lamellae* angustissimae, confertae, utrinque acutae, decurrentes, acie integerrimae, pallidae. *Stipes* teres, tenuis, laevis, basi subbulbosus, solidus, pileo concolor, 3-4 cm. longus, 4-5 mm. crassus. *Sporae* oblique ellipsoideae, hyalinae, 5 \times 3 μ .

SINGAPORE. On the ground, *E. M. Burkill* 82.

This species is remarkable for the thick flesh of the pileus, which remains convex when the plant is quite mature. Allied to *C. cerussata*.

Russula aeruginosa, Massee.

Pileus explanato-expansus, centro subdepressus, carnosus, aeruginosus, margine versus dilutior, cute non difficile separanda, 8-10 cm. latus. *Lamellae* latiusculae, confertae, antice rotundatae, albiae. *Stipes* laevis, glaber, aequalis, candidus, 8-10 cm. longus, 0.8 \times 1.2 cm. crassus. *Sporae* globosae, hyalinae, 6-7 diametro.

SINGAPORE. On the ground in the jungle, *E. M. Burkill* 63.

Allied to *R. olivacea*, but distinguished by the crowded gills and the readily separable cuticle.

Russula fragilis, Fries.

SINGAPORE. On the ground in the jungle, *E. M. Burkill* 232.

Lactarius bicolor, Massee.

Pileus plano-depressus, subcarnosus, obscure brunneus, margine repandus, 4-5 cm. latus. *Lamellae* ventricosae, distantes, postice attenuatae, dente majusculo decurrentes, acie integrae, griseae. *Stipes* teres, glaber, pileo concolor, 5-6 cm. longus, 6-8 mm. crassus. *Sporae* hyalinae, globosae, asperulae, 7-8 μ diametro.

SINGAPORE. Among fallen leaves in the jungle, *E. M. Burkill* 73.

In an accompanying note this fungus is said to be full of latex, but the colour and taste are not noted. Allied to *L. subdulcis*, Fr.

Hygrophorus chlorophanus, Fries.

SINGAPORE. On the ground in the jungle, *E. M. Burkill* 260.

Marasmius lanatus, Massee.

Pileus resupinatus, minutissimus, orbicularis, cupulatus, membranaceus, dorsi centro adfixus, albido-cervinus, floccoso-lanatus,

margine integro, involutus, 2-3 mm. latus. *Lamellae* e centro radiantes, angustae, brunneo-tinctae. *Sporae* ellipsoideae, hyalinae, $4 \times 3 \mu$.

SINGAPORE. On dead, fallen leaves of *Oncosperma*, *E. M. Burkill* 86.

Allied to *Pleurotus microscopicus*, Speg., but differs in having a woolly pileus and coloured gills.

Entoloma Burkillae, Massee.

Pileus carnosus, orbiculatus, glaber, laevis, margine subinvolutus, integer, leniter undulatus, toto intense coeruleus. *Lamellae* confertae, latiusculae, sinuatae, primo albidae, dein pallide incarnatae. *Stipes* rectus, teres, solidus, extus fibrosus, albidus vel pallide griseus. *Sporae* subglobosae, nodulosae, incarnatae, 8μ diametro.

SINGAPORE. On the ground in the jungle, *E. M. Burkill* 152.

A very beautiful fungus, belonging to a well-marked group of species characterised by the presence of clear blue tints. Most nearly allied to *E. ardosiacum*.

Inocybe umbrina, Massee.

Pileus hemisphaericus, dein explanatus, subumbonatus, sericeofibrillosus, hic inde rimosus, umbrinus, versus umbonem obscurior, 3-5 cm. latus. *Lamellae* adnatae, confertae, utrinque acutatae, pallide carneo-griseae. *Stipes* sursum attenuatus, solidus, fibrillosus, pileo concolor. *Sporae* ellipsoideae, laeve, pallide umbrinae, $8-10 \times 6-7 \mu$.

SINGAPORE. On a clay bank, *E. M. Burkill* 250.

This species belongs to the *Rimosae* section of *Inocybe*, and is mostly allied to *I. rimosa*, from which it differs in the umber-coloured cap and broadly elliptical spores.

Pholiota hepatica, Massee.

Pileus tenuis, applanatus, centro subumbonatus, margine rectus, laevis, glaberrimus, hepaticolor, medio obscurior, 5-6 cm. latus. *Lamellae* postice attenuatae, confertae, griseo-incarnatae, acie integrae. *Stipes* teres, rectus, fusco-fuliginosus, extus fibrillosus, 5-6 cm. longus. *Sporae* ellipsoideae, inferne lateraliter acutatae, lilacino-tinctae, $5 \times 3 \mu$.

SINGAPORE. On the ground, *E. M. Burkill* 204.

P. hepatica approaches *P. erebia* in general structure.

Flammula bella, Massee.

Pileus hemispherico-explanatus, margine regulari vel plus minusve undulato, pulchre fulvo-aurantiacus, squamulosus, 3-5 cm. latus. *Lamellae* confertae, angustae, utrinque acutatae, postice dente decurrentes, flavae. *Stipes* teres, solidus, extus fibrillosus, pallide lutescenti-fulvescentes, 4 cm. longus, 0.8-1 cm. crassus. *Sporae* oblongo-ellipsoideae, basi oblique apiculatae, pallide ferrugineae, $10 \times 5 \mu$.

SINGAPORE. On a path in the jungle, *E. M. Burkill* 134.

A very beautiful fungus with a tawny-orange cap and clear yellow gills. Allied to *F. sapinea*, from which it differs in the squamulose cap and narrow, crowded gills.

Agaricus tenuiceps, Massee.

Pileus tenuiter carnosio-membranaceus, hemispherico-expansus, gibbosus, fibrillosus, pallide umbrinus, centrum versus fuscescens, margine subinvolutus, 7-10 cm. latus. *Lamellae* liberae, angustae, confertae, demum umbrinae. *Stipes* erectus, solidus, extus minutissime fibrillosus, pallidus, 7-10 cm. longus, 0.8-1.2 cm. crassus; annulus membranaceus, albidus, persistens. *Sporae* ellipsoideae, umbrinae, $7 \times 4 \mu$.

SINGAPORE. On the ground under trees, *E. M. Burkill* 267.

Differs from *A. silvaticus* in the hollow stem and narrow, crowded gills. In all probability edible.

Stropharia minima, Massee.

Pileus hemisphaericus, tenuis, margine acuto, glaber, flavo-cinereascens, 1.5-2 cm. latus. *Lamellae* confertae, latae, antice acutae, postice subdecurrentes, acie integrae, in senectute umbrinae. *Stipes* teres, fistulosus, glaber, pileo concolor, 3 cm. longus, 2-3 mm. crassus, ad tertiam inferam partem subannulatum squamulosus. *Sporae* oblique ellipsoideae, saturatae fusco-brunneae, $6 \times 3 \mu$.

SINGAPORE. On horse dung, *E. M. Burkill* 266.

Resembles *S. semiglobata* in miniature.

Hypholoma sublateralium, Schaeff.

SINGAPORE. On and around trunks, *E. M. Burkill* 127.

Coprinus plicatilis, Fr.

SINGAPORE. On the ground in the jungle, *E. M. Burkill* 70.

Coprinus niveus, Fr.

SINGAPORE. On dung, *E. M. Burkill* 71.

AURICULARIACEAE.

Auricularia indica, Massee.

Pileus carnosus, gelatinosus, flaccidus, dimidiato-horizontalis, sessilis, rufescenti-brunneus, basin versus minute densique pruinosis, 3-4 cm. latus. *Hymenium* ceraceo-gelatinosum, irregulariter venosa vel porose effiguratum. *Sporae* ellipsoideae, hyalinae, $7 \times 5 \mu$.

SINGAPORE. On a dead log, *E. M. Burkill* 210.

Hirneola auricula-judae, Berk.

SINGAPORE. On dead wood, *E. M. Burkill* 191.

POLYPORACEAE.

Boletus indecorus, Massee.

Pileus pulvinatus, siccus, glaber, primitus levis dein rimoso-areolatus, umbrinus, 4-5 cm. latus. *Tubuli* stipiti adnati, curti, flavo-virentes; pori angulosi, minuti, aurei. *Stipes* solidus, deorsum attenuatus, pileo concolor, 5-6 longus, 1 cm. crassus. *Sporae* fusiformae, flavo-virides, $10 \times 4.5 \mu$. *Caro* albida, fractu roseo-tincta, 1 cm. crassa, compacta.

SINGAPORE. On the roots of trees in the jungle, *E. M. Burkill* 66.

A dull-coloured, inconspicuous little species, allied to *B. pachycephalus*, Mass., differing in the glabrous pileus, stem narrowed at the base, and in the change in colour of the flesh when exposed to the air.

***Boletus craspedius*, Massee.**

Pileus globoso-pulvinatus dein expansus, carnosus, glaber, nigro-brunneus centro saturatiore, 7-8 cm. latus. *Tubuli* stipiti adnati, brevissimi, flavo-virentes; pori minuti, rotundati, coccineo-flavescentes. *Stipes* solidus, teres, glaber, coccineus, 5 cm. longus, 2.5 cm. crassus. *Sporae* ellipsoideae flavo-tinctae, 10-11 × 5 μ . *Caro* compacta, flava, fractu virescens.

SINGAPORE. On the ground, *E. M. Burkill* 137.

Stature and general appearance of *B. luridus*. Differing in the cylindrical stem, larger spores, and in the flesh changing to green when broken.

XIII.—A NEW COVER-CROP.

(*Dolichos Hosei*).

W. G. CRAIB.

Last year Mr. E. Hose* drew attention to a cover crop which had proved highly satisfactory with him in Sarawak. In the same article there was an editorial note to the effect that Mr. Hose had sent cuttings which would be tried in the Kuala Lumpur Experimental Plantation. In response to an inquiry from Kew the Director of Agriculture, Kuala Lumpur, forwarded specimens for identification. The specimens could not be matched in the Kew herbarium, and as they did not appear to agree with any described species of *Dolichos* they have been made the type of a new species—*D. Hosei*—named after the discoverer.

In the course of his article quoted above, Mr. Hose says that for five years he has been experimenting with various leguminous plants as cover crops. His experience demonstrated to him that what was required was a low-growing leguminous plant which could be dug into the soil and which would reproduce itself in time to check the growth of weeds. For three years he had been planting *D. Hosei* with rubber and had then 200 acres planted with it—the result being that it had “proved itself in every way a success.” He describes the plant, which he says is indigenous in Sarawak, as forming a thick level mass about six inches thick on the ground; it will grow on almost any soil, but a light one for preference, and in six months after planting should prevent all wash, if planted three feet apart. The trees, he adds, are ring-weeded monthly. It “grows readily from cuttings but seeds are difficult to procure,” a fact which has been corroborated during the Kuala Lumpur experiments.

***Dolichos Hosei*, Craib** [Leguminosae-Phaseoleae]; a *D. bifloro*, Linn., calycis lobis brevibus recedit.

* Notes on a Creeping Bean—Agric. Bull. Fed. Mal. States, vol. i. p. 276.

Caules graciles, primo pilis deflexis densius tecti, mox pilis paucis plerumque divergentibus instructi, nodis radicales. *Folia* trifoliolata, petiolo communi ad 5 cm. longo supra canaliculato pilis deflexis subaureis parce instructo suffulta; stipulae lanceolatae, acutissimae, ad 6 mm. longae, infra insertionem inaequaliter bilobae, nervosae, dorso margineque pilis longiusculis sparse instructae; foliola lateralia inaequilatera, latere altero dimidiatim ovata, altero dimidiatim lanceolata, apice plerumque acuta, mucronulata, basi latere altero rotundata, altero cuneata vel cuneato-rotundata, ad 3.5 cm. longa et 2 cm. lata, terminalia a lateralibus usque ad 1 cm. distantia, plerumque elliptico-rhomboidea, vel angustius elliptico-rhomboidea, lateralibus subaequalia vel iis paulo majora, omnia chartacea vel membranaceo-chartacea, subtus pallidiora, pagina utraque pilis longiusculis sparse instructa sed marginem versus pilis brevioribus densius ornata, e basi trinervata, nervis lateralibus utrinque 2-3 supra conspicuis subtus prominulis, nervis transversis subtus uti reticulatione gracili conspicuis, petiolulis circiter 2 mm. longis pilis longiusculis divaricatis instructis suffulta; stipellae circiter 2 mm. longae. *Racemi* abbreviati, pauciflori, pedunculo communi 1.5-5.5 cm. longo superne praecipue pilis reflexis instructo suffulti; pedicelli 2 mm. longi, puberuli; bracteolae binae, 1.25 mm. longae. *Calycis* tubus circiter 2 mm. longus; lobi laterales lobo inferiori subaequales, deltoidei vel anguste deltoidei, acutiusculi, circiter 1 mm. longi; lobi duo supremi in unum aliis subaequilongum et circiter 2 mm. latum connati. *Vexillum* lineatum, circiter 5 mm. longum et 6 mm. latum, ungui vix 2 mm. longo; alae 6 mm. longae, 3 mm. latae, basi auriculatae, ungui 1.75 mm. longo; carina 6.5 mm. (ungui 2 mm. longo incluso) alta. *Ovarium* 3 mm. altum, sericeum; stylus basi gracilis, superne facie inferiore albo-barbatus. *Fructus* ad 4.5 mm. diametro.

SARAWAK. Described from specimens cultivated at Kuala Lumpur from cuttings supplied by Mr. Hose, Sarawak.

XIV.—THE GENUS MORENIA.

C. H. WRIGHT.

The genus *Morenia* was founded in 1794 by Ruiz and Pavon (Prodr. Fl. Peruv. et Chil. p. 150, t. 32), and named in honour of Dr. D. Gabriel Moreno, a medical man of Lima. No specific name was given in that publication, but in 1798 in their *Systema Veg. Fl. Peruv.* p. 299, it was called *M. fragrans*, and was said to have been found at Muña, Peru, where it was known as the "Siasia." The claim of *Morenia* to rank as a distinct genus has been upheld by several authors, amongst whom are Martius, H. Wendland, Drude, Karsten and Trail. Bentham and Hooker, in their *Genera Plantarum*, vol. iii. p. 911, united it and other genera with *Chamaedorea*, Willd. (Sp. Plant. vol. iv. pp. 638 and 800, 1805), which now contains about 60 species, most of which come

from Central America, while those referred to *Morenia* are Andine, except *M. integrifolia*, a native of Western Brazil. The original species of *Chamaedorea* was *C. gracilis*, Willd. (l.c. p. 800), which included *Borassus pinnatifrons*, Jacq. Hort. Schoenbr. ii. p. 65, tt. 247, 248.

Drude in Engler und Prantl's Natürl. Pflanzenfam. ii. III. 62, separates the two above mentioned genera thus:—

Chamaedorea. Male flower: Calyx annular or saucer-shaped. Petals at first connected at the apex. Stamens 6, usually included in the corolla.

Morenia. Male flower: Calyx 3-toothed. Petals broadly oval, acuminate, stellately spreading. Stamens 6, erect. [Male spadices usually whorled.]

The species of *Morenia* can be distinguished as follows:—

Leaves simply bilobed ... 1. *M. integrifolia*, Trail

Leaves pinnatisect:

Male inflorescence very dense:

Leaf-segments lanceolate ... 2. *M. Lindeniana*, H. Wendl.

Leaf-segments elliptic-

lanceolate ... 3. *M. fragrans*, Ruiz et Pavon

Male inflorescence lax:

Leaf-segments straight.

Stamens of equal length. 4. *M. corallina*, Karst.

Leaf-segments sigmoid.

Outer stamens longer

than the inner ... 5. *M. Poeppigiana*, Mart.

1. *M. integrifolia*, Trail in Journ. Bot. xiv. (1876), p. 331; Drude in Mart. Fl. Bras. iii. II. p. 525. Western Equatorial Brazil.

Var. *nigricans*, Trail, l.c. Western Equatorial Brazil.

2. *M. Lindeniana*, H. Wendl. in Bot. Zeit. xvii. (1859), p. 17; O. Drude in Mart. Fl. Bras. iii. II. p. 526. *Chamaedorea Lindeniana*, H. Wendl. in Otto & Dietr. Allg. Gartenz. xxi. (1853), p. 139. Andes of Colombia.

3. *M. fragrans*, Ruiz et Pavon, Syst. Veg. Fl. Peruv. p. 299; Mart. Hist. Nat. Palm. iii. p. 162, et Palm. Orbign. p. 7, tt. 3, 16; Bot. Mag. t. 5492 (excl. syns., *M. Lindeniana* and *Chamaedorea Lindeniana*); Drude in Mart. Fl. Bras. iii. II. p. 525. Peru and Bolivia.

This is not the same as *Chamaedorea fragrans*, Mart. (Hist. Nat. Palm. ii. p. 4, t. 3, figs. 1-2), which has bilobed leaves.

4. *M. corallina*, Karst. in Linnaea, xxviii. (1856), p. 274, and Fl. Columb. ii. p. 135, t. 171; Bot. Mag. t. 8527. Andes of Colombia.

5. *M. Poeppigiana*, Mart. Hist. Nat. Palm. iii. p. 161, tt. 140, 141; Spruce in Journ. Linn. Soc. xi. p. 123; O. Drude in Mart. Fl. Bras. iii. II. 526. Peru.

IMPERFECTLY KNOWN SPECIES.

- M. corallocarpa*, Hort. ex Wendl. Ind. Palm. p. 29 (nomen). Colombia?
M. ? pauciflora, Drude in Mart. Fl. Bras. iii. II. p. 526. *Chamaedorea pauciflora*, Mart. Hist. Nat. Palm. ii. p. 5. Brazil.

EXCLUDED SPECIES.

- M. Chonta*, Phil. in Bot. Zeit. xiv. 1856, p. 648, et in Anal. Univ. Chil. 1856, p. 168 = *Juania australis*, Drude. Juan Fernández.
M. Ernesti-Augusti, H. Wendl. in Otto & Dietr. Allg. Gartenz. xxi. (1853), p. 3 = *Chamaedorea Ernesti-Augusti*, H. Wendl. Mexico.
M. oblongata, H. Wendl. in Otto & Dietr. Allg. Gartenz. xxi. (1853), p. 3 = *Chamaedorea Sartorii*, Liebm. Mexico.

XV.—DIAGNOSES AFRICANAE: LVII.

1481. *Millettia* (Efulgentes) *Lane-Poolei*, Dunn [Leguminosae-Galegeae]; *M. rhodanthae*, Baill. affinis, sed calycibus et foliolis glabris et foliolorum basi rotundata distincta.

Arbor parva, ramulis laevibus. *Folia* 4-juga, 9–11 cm. longa, petiolo 8-plo longiora, rachi glabra gracili; stipulae ovatae, scariosae, striatae, 3 mm. longae; foliola superiora lateralia oblongo-lanceolata, apice acuminata, basi rotundata, membranacea, glabra, 3 cm. longa, venis marginem appropinquantibus 7-paribus inconspicuis; petioluli 2 mm. longi; stipellae setaceae, 2 mm. longae, persistentes. *Paniculae* racemiformes axillares, 4–6 cm. longae, pedunculo subnullo, rachi puberula; nodi floriferi pauciflori, 3–4 mm. longi. *Flores* approximati, 1.1 cm. longi; pedicelli calyce paullo breviores; bractae bracteolaeque 1–2 mm. longae, deciduae. *Calyx* campanulatus, 4 mm. longus, praeter marginem puberulam glaber; dentes tubo 6-plo breviores, late triangulares. *Petala* glabra; vexilli lamina ovato-rotundata, basi subcordata, medio valde bicallosa; alae ovatae, basi breviter sagittatae; carinae petala oblonga, sub-acuta, basi ut alae. *Stamina* 10, vexillari basi soluto et ibi saepe callis vexilli retento. *Discus* lineatus, calyci adnatus. *Ovarium* lineare, puberulum, 8-ovulatum. *Legumen* non visum.

TROPICAL WEST AFRICA. Sierra Leone: Keunema (flowering in March), *C. E. Lane-Poole* 140.

1482. *Senecio Conrathii*, *N. E. Brown* [Compositae-Senecionideae]; affinis *S. serrae*, Sond., corymbi ramis multo longioribus et capitulis majoribus bene distinguitur.

Herba 60–70 cm. alta. *Caulis* simplex, erecta, basi 5 mm. crassus, striatus, glaber. *Folia* lineari-lanceolata, acuta, callososerrata, glabra, 0.8–1.3 cm. lata, inferiora 15–19 cm. longa, petiolata, superiora gradatim minora, sessilia. *Corymbus* circa 10 cm. diametro, glaber, ramis inferioribus 15–24 cm. longis erectis. *Bractae* 1–4 cm. longae, e basi 1.5–4 mm. lato subulato-

attenuatae, glabrae. *Capitula* radiata, lutea, disco 1·2–1·3 cm. diametro; involucri segmenta subtriseriata, subaequalia, 7–8 mm. longa. linearia, acuta, glabra; ligulae 0·8–1 cm. longae, 4 mm. latae. *Pappi* setae copiosae, albae.

SOUTH AFRICA. Transvaal: near Modderfontein, *Conrath* 1320.

In foliage this is very like *S. serrae*, Sond., but the very much longer and more erect branches of the corymb and much larger flower-heads at once distinguish it.

1483. *Senecio sulcicalyx*, *N. E. Brown* [Compositae-Senecionidae]; affinis *S. crassulaefolii*, Sch. Bip., sed caulibus multo brevioribus et gracilioribus, pedicellis longioribus, involucri conspicue sulcato et antheris purpureis bene distinguitur.

Herba succulenta humilis. *Caules* et *rami* 1–3 cm. longi, 3 mm. crassi, glabri, subnodosi, virides. *Folia* subconferta, adscendentia, 1·5–4 cm. longa, 6–8 mm. lata, 4–6 mm. crassa, carnosa, semitereti-lanceolata, supra depressa et sulcata, subtus valde convexa, apice acuta, basi in petiolum brevem attenuata, viridia, glauca. *Pedunculus* usque ad 7 cm. longus, 1·5 mm. crassus, apice furcatus vel uniramosis, viridis, leviter glaucescens. *Pedicelli* 2–3 cm. longi, glauci. *Capitula* discoidea, 20-flora 8–9 mm. diametro. *Involucrum* 6–7 mm. longum, 4–4·5 mm. diametro, cylindricum, breviter 12–13-dentatum, glaucum, profunde 12–13-atro-sulcatum. *Corolla* tubularis, 5-loba, alba. *Stamina* exserta, purpurea, polline lutea. *Styli* luteo-albi.

SOUTH AFRICA. Little Namaqualand: in crevices of quartz and granite rocks on the upper north-west slopes of a hill south-west of Chubiessis, *Pearson* 6198.

1484. *Dobera Alleni*, *N. E. Brown* [Salvadoraceae]; affinis *D. loranthifoliae*, Warb. sed foliis latioribus, petalis obtusioribus, tubo stamineo subduplo brevior apice inter filamentas dentato, antheris haud apiculatis et stylo duplo longiore differt.

Arbor magna, cortice ramorum cinereo. *Folia* opposita, glabra; petiolus 5–8 mm. longus; lamina 4·5–7·5 cm. longa, 2·2–4·5 cm. lata, lanceolata, ovata vel elliptica, obtusa vel subacuta, basi obtusa vel late rotundata, subtrinervia. *Paniculae* axillares, foliis breviores, 2–5 cm. longae, 2·5–6 cm. latae, ramis oppositis vel alternis minute tomentosis. *Flores* sessiles, oppositi vel suboppositi. *Calyx* 2–2·3 mm. longus, subcampanulato-tubulosus, apice breviter et obtuse 4-dentatus, minutissime tomentosus. *Petala* 4, erecta, 3 mm. longa, 1·5 mm. lata, elliptica vel lanceolata, subacuta, glabra. *Glandulae* disci 4, magnae. *Tubus stamineus* 1·6 mm. longus, apice inter partes liberas 0·25 mm. longas filamentorum minute dentatus; antherae erectae, 1 mm. longae, deltoideo-ovatae, subobtusae nec apiculatae, basi cordatae. *Ovarium* cum stylo vix 2 mm. longum. *Fructus* immaturus, ovoides, subacutus, calycem longe excedens.

TROPICAL AFRICA. Portuguese East Africa: Antari, *Allen* 95.

This curious genus although undoubtedly allied to *Salvadora*, yet in its free petals, stamens united into a tube and the four large glands exterior to the staminal tube, shows considerable affinity

to the genera *Aptandra* and *Ongokea* in *Olacineae*, but differs from them in its opposite leaves, tubular calyx, anthers and ovulation. Specifically it is certainly very similar to *D. loranthifolia*, Warb., but its flowers differ strikingly from those of that species by having a very much larger staminal tube, with teeth between the very short free part of the filaments, no apiculus to the anthers and a very much longer style.

1485. *Strophanthus hypoleucus*, Stapf [Apocynaceae-Echitideae]; affinis *S. Eminii*, Asch. & Pax, sed foliis rotundis minoribus subtus albo-pannoso-tomentosis, floribus solitariis longiuscule pedicellatis, florum caudis brevioribus, antheris magis minusve exsertis distinctus; a *S. Schuchardtii*, Pax, cui quoad habitum similis, florum structura plane differt.

Frutex ramis novellis tomentellis mox glabratis cortice castaneo vel fuscescente obtectis, lenticellis paucis orbicularibus majusculis. *Folia* rotundata, basi breviter contracta, apice saepius emarginata, 3-5 cm. diametro, supra viridia, tenuiter velutino-pubescentia, subtus albo-pannoso-tomentosa, nervis lateralibus utrinque circiter 6 obliquis, venarum reticulatione ob indumentum densum plerumque obscura; petioli tomentosi, ad 4 mm. longi. *Flores* in ramulis axillaribus vel terminalibus tenuibus folia plerumque valde reducta vel bracteolas gerentibus solitarii; ramuli ipsi solitarii, raro geminati, tomentelli; pedicelli 1 cm. longi. *Calyx* foliaceus, 0.8-1 cm. longus; sepala valde inaequalia, exteriora 3 ovata, ad 5 mm. lata, interiora lanceolata, omnia acuta vel subacuminata, utrinque tomentella (extus densius). *Corollae* tubus infundibuliformis, extus tenuiter tomentellus vel pubescens, parte infra staminum insertionem sita 7-8 mm. longa intus tenuissime parceque pubescente, parte superiore 6-7 mm. longa intus glabra; lobi oblongi, 1-1.3 cm. longi, 5 mm. lati, in caudam filiformem 3 cm. longam contracti; squamae fauciales ovatae, 1 mm. paulo longiores. *Antherae* 4-4.5 mm. longae, pro magna parte exsertae, acute acuminatae; filamenta superne dilatata, ad 3 mm. longa. *Ovarium* ima basi glabra excepta fulvo-hispidum. *Folliculi* ignoti.

TROPICAL AFRICA. Portuguese East Africa: Mount M'Kota near Ibo, *Stocks* 148.

1486. *Barleria Methuenii*, Turriill [Acanthaceae-Acanthoidae]; *B. Prionitis*, Linn. affinis, sed foliis angustioribus, sepalis brevioribus ciliatis recedit.

Frutex 3 m. altus (ex *Methuen*), ramis bisulcatis sulcis dense hirsutis exceptis fere glabris. *Folia* oblongo-lineararia, apice obtuse mucronata, basi cuneata vel late cuneata, usque ad 3.5 cm. longa, 1.2 cm. lata, integra, costa supra leviter impressa infra prominente, nervis lateralibus pagina utraque inconspicuis; petiolus usque ad 5 mm. longus. *Inflorescentia* breviter spicata, floribus in foliorum superiorum minorum axillis solitariis; bracteolae elliptico-ovatae vel oblongo-lineares, longe acuminatae, usque ad 5 mm. longae (acumine incluso), 2 mm. latae, leviter ciliatae. *Spinae* (bracteolae steriles ?) usque ad 1.1 cm. longae, trifidae. *Calyx* fere ad basin divisus, segmentis 4 conspicue ciliatis, postico

ovato-oblongo apice obtuso vel rotundato mucronato 9 mm. longo 5 mm. lato, antico ovato-oblongo apice obtuse mucronato 8 mm. longo 5 mm. lato, lateralibus lanceolatis apice acute mucronatis 8 mm longis 2 mm. latis. *Corolla* bilabiata, 4·7 cm. longa, tubo 1·3 cm. longo, labio antico oblanceolato-oblongo integro apice rotundato 2 cm. longo 9 mm. lato, postico 3·4 cm. longo 2·7 cm. lato 4-obolato, lobis apice leviter emarginatis vel rotundatis, lateralibus obovatis 1·5 cm. longis 1·1 cm. latis, intermediis oblanceolato-oblongis 1·5 cm. longis 7 mm. latis. *Stamina* 2, filamentis 3 cm. longis glabris, antheris 4 mm. longis; pollinis granula globosa, 110 μ diametro; staminodia duo, 2 mm. longa. *Discus* 1·75 mm. altus; integer. *Ovarium* obpyriforme, 5 mm. altum, 2·25 mm. diametro, glabrum, biloculare, loculis uniovulatis; stylus 3·3 cm. longus, glaber.

MADAGASCAR. Ambotaba—Meloba (?), *P. A. Methuen* 30.

1487. *Cardanthera parviflora*, Turrill [Acanthaceae-Acanthoideae]; affinis *C. brevitubo*, Turrill (*Synnema brevitubo*, Burkill), sed foliis heterophyllis, corolla minore, stylis gracilioribus distinguitur.

Herba erecta, ramosissima, ramis hirsutis bisulcatis. *Folia* oblongo-vel lineari-oblanceolata, apice acuta, basi leviter angustata, usque ad 5·3 cm. longa et 9 mm. lata, integra plus minusve grosse serrata vel pectinata, hirsuta, costa pagina utraque leviter prominente, nervis lateralibus inconspicuis. *Flores* 4-7 in foliorum superiorum axillis aggregati. *Calyx* hirsutus, segmentis 5 linearibus acutis, postico 9 mm. longo 1 mm. lato, anticis et lateralibus 5 mm. longis 0·5 mm. latis. *Corollae* tubus 2 mm. longus, apice 3 mm. diametro, ima basi 1 mm. diametro, extra leviter pubescens, fauce pluri-squamatus; labium posticum valde reductum, apice integrum vel leviter bifidum, 2·5 mm. longum, 2·5 mm. latum, anticum 5 mm. longum, 4 mm. latum, trilobatum, lobis obovato-ellipticis 2 mm. longis 1·5 mm. latis basi lineis longitudinalibus carnis aurantiacis ornatis. *Stamina* 4, filamentis 6 mm. longis glabris; antherae 1 mm. longae, loculis inter se aequalibus; pollinis granula globosa, 30 μ diametro, longitudinaliter costata. *Ovarium* cylindricum, 2·25 mm. altum, 0·75 mm. diametro, glabrum; stylus (cum stigmatibus) 5·5 mm. longus, hirsutus. *Capsula* biconvexe cylindrica, 4·5 mm. alta, 1·5 mm. diametro, valde bisulcata, glabra, retinaculis parvis haud curvatis; semina numerosa, biconvexe ovoideo-oblonga, dense et molliter pubescentia.

TROPICAL AFRICA. Northern Nigeria: Abinsi, a herb in rice fields, Dec. 1912, *J. M. Dalziel* 720.

Synnema has generally but incorrectly been considered an earlier name for *Cardanthera*. *Synnema* was described by Benth. as a genus of Scrophulariaceae in DC. Prodr. X., 1846, p. 538, while *Cardanthera*, a name given by Buchanan-Hamilton in MS., was first published by Voigt in "Hortus Suburbanus Calcuttensis," 1845, p. 482, being based on *Ruellia triflora*, Roxb. It is therefore clear that since *Synnema*, Benth. is not a nomen conservandum it must, according to the Vienna rules, be replaced by *Cardanthera*, Buch.-Ham. ex Voigt.

1488. **Sansevieria intermedia**, *N. E. Brown* [Liliaceae-Dracaceae]; affinis *S. cylindrica*, Boj., sed foliis canaliculatis et aciebus canaliculi inferne acutis superne obtuse rotundatis differt.

Herba succulenta, acaulis. *Folia* erecta, rigida, 45-120 m. longa, 1-1.8 cm. crassa, subcylindrica, facie canaliculata, dorso plurisulcata, apice acuta; canaliculus foliorum centralium inferne aciebus acutis superne obtuse rotundatis. *Racemus* cum pedunculo 20-45 cm. longus, densus, spiciformis. *Fasciculi* conferti, 3-6-flori. *Bractea* 2-4 mm. longae, ovatae vel ovato-lanceolatae, acutae, membranaceae. *Pedicelli* 2 mm. longi, apice articulati. *Flores* leviter patuli; tubus 1.4-1.8 cm. longus, basileviter inflatus et 2.5 mm. diametro, pallide virens; lobi 1.2-1.8 cm. longi, lineares, obtusi, revoluti, albidii, dorso minutissime purpureo-punctati.

TROPICAL AFRICA. British East Africa: Tsavo district, Powell 9.

Described from a living plant cultivated at Kew, which flowered Nov. 5th, 1913.

1489. **Juncus gentilis**, *N. E. Brown* [Juncaceae-Eujuncaceae]; similis *J. oxycarpo*, E. Mey., sed floribus sordide purpureo-castaneis segmentis minus attenuatis, stigmatibus subsessilibus, capsula perianthio breviori apice obtusiori et regione differt.

Herba perennis, erecta, ad 36 cm. (vel ultra ?) alta, omnino glabra. *Folia* radicalia 2-3, caulina 3, teretia, septata, 1 mm. diametro, basi vaginata; vaginae membranaceo-marginatae, apice in auriculas duas 3-5 mm. longas lineari-oblongas obtusas productae. *Cyma* terminalis, ramis 3 inaequalibus 4-9 cm. longis capituligeris. *Bractea* membranaceae, floribus multo breviores, ovatae acutae. *Perianthii* segmenta 3 mm. longa, lanceolata, acuminata, sordide purpureo-castanea, exteriora concava, carinata, interiora plana. *Stigmata* subsessiles. *Capsula* perianthio brevior, trigona, apice obtusa, minutissime apiculata. *Semina* sordide ochracea, apice nigra.

SOUTH AFRICA. Transvaal: near Modderfontein, Conrath 1173.

1490. **Cymbopogon plicatus**, *Stapf* [Gramineae-Andropogoneae]; *C. pruinoso*, Chiov., et *C. excavato*, Stapf, arete affinis, sed laminis angustis plicatis costa subtus acuta, ligulis longicribus, paniculae axis primariae internodiis longioribus, ramorum fasciculis ideo magis dissitis et valva superiore profundius fissa distinctus.

Gramen perenne, dense caespitosum, rhizomate brevi, radicibus fibrosis permultis tenacibus ad 25 cm. longis albidis, innovationibus extra- et intravaginalibus illis vero axi e qua ortae sunt arete adpressis; culmi fasciculati, erecti, graciles, saepe fere metrales, simplices, plerumque 4-nodi (infra inflorescentiam). internodiis ad 20-23 cm. longis. *Foliorum* vaginae glaberrimae, imae demum evanidae et culmi basin annuliformibus cicatricibus notatam gracilem ad 1.5 cm. longam radicansem desinentes, vel omnes diutiuscule persistentes et tunc a culmo retractae, rigidulae, arete striatae, saepe laminam parvulam gerentes, superiores culmos arete amplectentes, ad 7 vel interdum 10 cm. longae; ligulae scariosae, oblongae, 2-3 mm. longae secundum vaginae os

sensim decurrentes; laminae innovationum arcte plicatae vel superne explanatae, lineares, superne longe tenuiterque attenuatae, basin versus haud dilatatae, ad 3 mm. latae, foliorum caulicorum similes, nisi longiores (ad 15 vel interdum 18 cm. longae), ad 5 mm. latae et magis apertae, basi breviter contractae ut ligulae latera exponantur, omnes paulo glaucescentes, glabrae, praeter margines superiores asperulos laeves, marginibus saepe revolutis, costa supra albicante subtus acuta, nervis lateralibus paulo prominulis utrinque 4-5. *Paniculae* angustae, 10-18 cm. longae, rhachi primaria gracili 3-5-noda, nodis inferioribus 2.5-3.5 cm. distantibus; rami primarii e nodis inferioribus vel etiam mediis orti plerumque fasciculati, spatha laminigera lamina exclusa ad 4 cm. longa suffulti, superiores solitarii, e spatharum lamina destitutarum axillis orti, longiores 3-4 cm. longi, graciles, erecti, paucinodi, ramulis racemigeris e nodis inferioribus ortis fasciculatis vel omnibus solitariis; pedunculi racemorum paria gerentes, 4-7 mm. longi, spatha speciali lineari lanceolata acuta 1.5-2 cm. longa longe superati et ea toti vel fere toti inclusi. *Racemi* divergentes, plerumque deflexi; pedunculi speciales brevissimi, unus altero paulo longior, uterque in latere interiore pulvine epinastico villosomunitus; racemus subsessilis paulo brevior, plerumque 4-nodus, spicularum pare infimo homogamo ♂; pedunculatus plerumque 5-nodus, 1-1.5 cm. longus, spicularum paribus omnibus heterogamis; articuli pedicellique simillimi, graciles nisi infimi breviores paulo incrassati, 2 mm. longi, utrinque dense albo-ciliati, ciliis sursum accrescentibus articuli diametro usque ad duplum longioribus, apice in cupulam denticulatam uno latere magis productam dilatati. *Spiculae sessiles* ♀ anguste oblongae, 4-4.5 mm. longi, pallide virides vel saepius magis minusve purpurascetes, glabrae. *Gluma* inferior apice subacuta vel truncatula, in dorso fere tota longitudine latiuscule sulcata vel superne plana, 2-carinata, carinis superne anguste vel angustissime alatis scaberulis, nervis intercarinis 2 vel obsoletis, basi supra callum brevem impressa; gluma superior lanceolata, navicularis, acuta hyalina, 1-nervis, inferiori aequilonga. *Valva* inferior quam glumae paula brevior, anguste lanceolata, superne ciliata, tenuissime 2-nervis, vacua; valva superior ad medium bifida, linearis, 3 mm. longa, lobis angustissimis ciliatis, aristae columna laevi gracili 5-6 mm. longa, seta quam columna vix longiore. *Paleae* 0. *Antherae* 2-2.5 mm. longae. *Spiculae pedicellatae* (et sessilis paris homogami) ♂, lanceolatae, acutae, 4-4.5 mm. longae, virides vel purpurascetes. *Gluma* inferior 7-9-nervis (vel in spicula sessili ♂ 4-nervis), superior 3-nervis. *Valva* inferior oblonga, acuta, glumis subaequilonga, hyalina, tenuiter 2-nervis; superior 0. *Antherae* 2-2.5 mm. longae.

MADAGASCAR. "Central Madagascar," Parker 12 (with the vernacular name "tena vèro"); Imerina, among tall grass on the hills, *Hildebrandt* 3256; without precise locality, Herb. Nogent-sur-Marne.

The root stocks and roots exhale a faint, sweet odour, like that of *Cyclamen europaeum*.

XVI.—MISCELLANEOUS NOTES.

MR. F. G. COUSINS.—We understand that Mr. F. G. Cousins, formerly a member of the gardening staff of the Royal Botanic Gardens, has been appointed a Sub-Inspector for the purposes of the Destructive Insects and Pests Acts under the Board of Agriculture and Fisheries.

MR. J. F. WABY.—We learn that Mr. J. F. Waby, F.L.S., Head Gardener at the Botanic Gardens, Georgetown, British Guiana, has retired from this post after thirty-five years' service in the Colony. Mr. Waby's colonial experience commenced in Trinidad in 1873, where he was appointed Head Gardener to the Botanic Gardens on the recommendation of Kew. In 1879 he was transferred to British Guiana, and has held the post of Head Gardener at the Botanic Gardens, Georgetown, to their very great advantage since that date.

Mr. Waby was associated with the late Mr. G. S. Jenman in the work of building up the collections and generally developing the Gardens, which contain so fine a collection of interesting plants. During his long period of service in British Guiana he has acquired an intimate knowledge of the flora, as well as of economic plants, which has proved of great value to the Colony as well as to those who have been associated with him in the Agricultural Department.

We are glad to notice that Mr. Waby's retirement has been made the occasion for the presentation of a testimonial by Professor J. B. Harrison on behalf of the Board of Agriculture and the staff of the Department, and that the Governor, in appreciation of the valuable services rendered to the Colony by Mr. Waby, has been pleased to appoint him an honorary member of the Board of Agriculture.

The History of the Royal Botanic Gardens.—The acquisition for Kew, by exchange, of a bulky volume of manuscript and cuttings on the history of Kew, compiled by the late John Smith, senior Curator of the Gardens for many years, up to 1864, announced in *K.B.* 1913, p. 62, and the recent gift by Mr. John Reader Jackson, formerly Curator of the Museums, of a manuscript book by Alexander Smith, son of John, call for a few words of appreciation and explanation. It is so long since John Smith, senior, retired from active life that it is not superfluous to state that it was in consequence of failing sight, which soon developed into total blindness. Nothing daunted, he courageously continued publishing from the accumulations of a long period of activity. His intention had been to publish a history of the Gardens, but this was reduced to his "Records of the Royal Botanic Gardens, Kew," which appeared in 1880. The difficulties attending such a task, in the circumstances, are evident, and

how much original information still remains unpublished can only be ascertained by close comparison. But the manuscript certainly contains much of John Smith, senior's, opinions and experiences in relation to the changes that took place during his period of office that he wisely refrained from publishing. The manuscript by his son, Alexander Smith, presented by Mr. Jackson, is a "List of Stove and Greenhouse Plants in the Royal Botanic Gardens, Kew, prepared in 1848 (not complete)." To which J. Smith, senior, has added: "By Alexander Smith, my son, who died 15th May, 1865, aged 33." The list is throughout in Alexander's neat handwriting, with here and there a few additions and remarks by his father, who doubtless utilised it in his Records of upwards of fifteen years later; but there are many discrepancies not easy of elucidation. Alexander's list is, however, a highly interesting document of itself, whether compiled from the plants actually existing in the collection in 1848, or from registers covering a number of years. The classification adopted is that of Lindley's "Vegetable Kingdom," and the limitations of the natural orders are nearer that of Engler than that of Bentham and Hooker. I have not totalled the species, or names, myself, but in John Smith's handwriting at the end it is given as 5141—a grand number considering the relatively limited extent of the glasshouse accommodation then available. Accepting Lindley's limitations of the natural orders, 206 were represented in the indoor collections of those days. Succulents and hard-wooded plants were to the front. The list of *Cactaceae* runs to 260 species, belonging to eleven genera, and no fewer than 170 names of species of *Mesembryanthemum* are given. Taking the *Proteaceae* and *Ericaceae* among hard-wooded plants the former number 145 species belonging to twenty-three genera, and *Erica* itself is accredited with about 220 species, to say nothing of varieties, of which fifteen are given under *E. ventricosa* and seven under *E. vestita*! Cape *Amaryllidaceae*, *Iridaceae* and *Liliaceae* were also exceedingly numerous. On the other hand, of *Pelargonium* and *Geranium* combined, only 24 species are enumerated. Orchids are not enumerated in detail, but there is a reference to a "special list" of 815 species. These included, we are informed, a large number of inconspicuous kinds obtained from the famous Loddiges. Returning to the "History," it may be mentioned that there is an index to the "principal events" comprising about sixty headings, and there is a list of plants—"Additions to the Printed Records grown in different hot-houses before 1864." It comprises about 700 species. Looking at the long lists of names under *Mesembryanthemum*, *Erica*, etc., the presence of unpublished garden names might be suspected; but a careful collation of the 179 names of *Mesembryanthemum* with the "Index Kewensis" led to the discovery of no unauthenticated ones. Alexander Smith's list is evidently a compilation of great accuracy. Haworth figures almost exclusively as the describer of the new species of the period of *Mesembryanthemum*. Unfortunately the only guide to many of his species is limited to contemporary drawings in the Kew collection. As late as 1860, Kew still possessed a fine collection of these *Mesembryanthemums*,

consisting largely of veteran plants, which filled a small lean-to house at the back of a cottage or bothy on the site of the present T-range.
W. B. H.

Alexander Smith.—In connection with Alexander Smith referred to in the above note it may be mentioned that he arranged Sir W. Hooker's and his father's beginnings of a Museum of Economic Botany between the years 1847 and 1856. In the latter year he was appointed Curator of the Museum, but he resigned the post in 1857 owing to ill health. He was appointed clerk in the Herbarium in 1863, not curator as stated by Seeman (*see Journ. Bot.* 1865, pp. 199–200).
W. B. H.

Douglas Spar.—The following paragraph appeared in the *Kew Bulletin*, 1896, p. 97:—

“The great flagstaff in the Arboretum at Kew is one of the most conspicuous landmarks of the neighbourhood. It is the second of two spars which were presented to the Royal Gardens with great public spirit by Edward Stamp, Esq., of the firm of Messrs. Anderson, Anderson and Co. The first was from British Columbia, and was 118 ft. in length. It was broken in course of erection in 1859. The existing spar came from Vancouver Island, and is 159 ft. in length. It was erected in 1861, and is believed to be the tallest spar in the old world. The age of the tree from which it was cut was about 250 years, and its total height 180 ft. The base had gradually become decayed, and on examination it was pronounced by the Admiralty to be unsafe. Messrs. Anderson, Anderson and Co. were, however, of opinion that it might still be preserved, and on their recommendation the work was placed by H.M. Office of Works in the hands of Messrs. Robinson and Dodd, contractors to H.M. Indian Government, of Bridge Road Works, Poplar. They successfully lowered it, removed the decayed base, and spliced on a new one of pitch pine. The splice is held together by five iron bands. The spar was then re-erected on February 4th last.”

It was estimated that by the above repairs thirty years had been added to the “life” of the spar. But this estimate has not been justified by experience.

It has been the rule to overhaul, scrape, varnish and do any minor repairs necessary to the spar and rigging at intervals of two years. When this was done in May last, it was discovered that “dry rot” had attacked the lower end of the new pitch-pine butt, and that “wet rot” had made considerable inroads in the splice of the old spar to the new butt. It was therefore decided to take it down so that a careful examination could be made of the whole spar, and any necessary repairs could be made.

The spar was successfully lowered in November last. From the closer examination which it was then possible to make, ample justification was found for taking it down. The “dry rot” affecting the butt had evidently commenced in the sleeper plate on which the spar stood, and spread up the new butt to a height

of about 7 ft. At the bottom end, for a height of about 2 ft., more than half the sectional area had been completely destroyed. Yet nothing of this was apparent at the surface, which was well covered with a film of tar.

The original spar which was spliced into the new butt was found to have suffered severely from "wet rot." This extended from the bottom of the splice to a height of some 30 ft. up the spar. The outer varnished surface appeared generally sound. But the rains which had beaten against the spar had entered the ever-active shakes, and travelled down shakes and tissue to the splice which was quite sodden. There was no way of escape for this enclosed water, and so wet rot resulted. There remains about 110 ft. of the original spar in a fairly sound condition, and this may be considered worthy of re-erection.

It is to be hoped, however, that in course of time a new spar may be forthcoming from Vancouver, which, like its predecessor, would serve as an object lesson and give some idea of the grandeur of the great Douglas Fir trees of the Island.

Presentation of Conifer Cones by Sir Harry J. Veitch.—Sir Harry J. Veitch has generously presented to the Royal Botanic Gardens, Kew, the important collection of Conifer cones which for many years has formed so interesting a feature of the Veitchian establishment at Chelsea. It consists of 170 species, including upwards of 60 Pines, 26 Firs, and a similar number of Spruces. The collection is of historical as well as of botanical interest for, in the main, it comprises the specimens contributed by Messrs. Veitch's collectors in North and South America, China, Japan and other countries between 1840 and the present date. Between 1849 and 1852 Mr. W. Lobb collected large quantities of seeds of various Western North American Conifers which had been previously noted by Douglas, and it was owing largely to his energy that such species as *Pinus Sabiniana*, *P. Coulteri*, *P. muricata*, *P. tuberculata*, *P. monticola*, *P. Lambertiana*, the two *Sequoias*, *Abies magnifica*, *A. nobilis*, and *A. Lowiana* became widely distributed. During the latter half of the nineteenth century the collection was added to by many collectors, including Mr. John Gould Veitch, who, amongst other countries, visited Japan and Australia between the years 1860 and 1870. In recent years a number of Chinese species have been added by Messrs. E. H. Wilson and W. Purdom, a few of the newer species being *Abies recurvata*, *Picea asperata*, *P. complanata*, *P. purpurea*, *P. montigena* and *P. Wilsoni*. Cones of European species and of various kinds ripened in this country were added from time to time by the late Mr. A. H. Kent, and it was from the cones in this collection that Mr. Kent drew up his descriptions for "Veitch's Manual of Coniferae," a book which has long been looked upon as a standard work on the subject. The first edition appeared in 1881 and the second in 1900.

A few of the most striking looking cones in the collection are *Pinus Coulteri*, weighing 3 lbs. 14½ ozs., *P. Ayacahuite*, 15 inches long, *P. Lambertiana*, 18 inches long and *Araucaria Bidwillii*, 3 lbs. 4 ozs. in weight.

W. D.

Presentation of Old Keys.—Two relics of a long past régime at Kew have recently been presented to the establishment by the Hon. Arthur F. G. Leveson-Gower. They are two keys of an old pattern, one of them inscribed "Botanic Garden V.R."; the other "Kitchen Garden No. 2, W.R." There is no doubt they were used during the period between the accession of William IV. in 1830, and the transference of the Botanic Garden at Kew to the public by Queen Victoria in 1840. At this time the northern part of Kew nearest Kew Green was divided up by walls, some of which had originally enclosed the gardens attached to the houses on the south side of the Green. The Botanic Garden itself, covering 9 acres was wholly or partially enclosed by walls, a remnant of which (the only one that now remains above ground) is close to the old ice well and hardy fernery. The key inscribed "Botanic Gardens, V.R." was, no doubt, used for entrances through these walls, or for the plant-houses inside.

One of the first alterations effected by Sir W. Hooker after his appointment in 1841, was the gradual removal of these walls, which must, of course, have debarred the production of broad effects by lawns and trees, such as now exist. On the other hand, many interesting wall plants—some of historical interest—must have disappeared, as well as many snug corners such as the cultivator of tender exotics would delight in.

With regard to the "Kitchen Garden" inscribed on the other key, this occupied the ground in the north-east corner of the grounds now given over to the cultivation of herbaceous plants. It is bounded on the east by the Kew Road wall and on the west by another brick wall. William Townsend Aiton, when he resigned the administration of the Botanic Garden in 1840 still retained charge of this Kitchen Garden and the Pleasure Grounds. In 1846, after 53 years' service in the establishment, he resigned the management of these also.

The history of these keys—could one learn it—might be interesting. They were purchased by Mr. Leveson-Gower in an old shop and can scarcely have been of use to anyone for some sixty or seventy years past. The residents in some of the houses on the south side of Kew Green backing on to the Gardens were officials or retired servants of the Crown, who had the privilege of entry into the Gardens. Perhaps to one of these the keys may have been issued and by them not returned when the walls or entrances were removed. At the present time a register of the official keys is kept and a periodical inspection rigidly maintained.

W. J. B.

Orchids Flowered at Kew in 1913.—The collection of Orchids cultivated under glass is well known for its richness in types and for the large number of rare and little-known species it contains.

The year 1913 has been remarkable on account of the large number of species belonging to 137 distinct genera which have flowered in the collection. A careful record has been kept of each plant which has flowered during the year and from this we find that the only plant of *Cirrhopetalum Mastersianum* has flowered

on six occasions, *Dendrocolla Pricei*, a new species, and *Kefersteinia graminea* on three and quite a number of other plants have flowered twice during the year. A few fine specimen plants have also flowered profusely, the best of these being:—*Eria hyacinthoides* with 34 racemes, *Eulophiella Elisabethae* with 11 racemes, *Vanda suavis* with 14 racemes, *Calanthe* × *Dominyi* with 15 racemes, *Coelia macrostachya* with 6 racemes, *Pleurothallis Roezlii* with 31 racemes, and *Miltonia candida* with 32 racemes bearing 274 flowers. *Lycaste Deppei* bore 54 flowers; *L. gigantea* 16 flowers; *Cirrhopetalum robustum* 7 umbels of flowers, and *Cattleya* × *Portia* had an inflorescence of 13 flowers.

The following list includes all those genera which have flowered during the year, only those species being mentioned which have been exceptionally fine or which are of particular interest on account of their rarity:—

- Acampe*, 3 species, including *A. papillosa*.
- Acanthophippium sylhetense*.
- Aceras hircina*.
- Acineta Humboldtii*.
- Ada aurantiaca* and its var. *maculata*.
- Aerides multiflorum*, *A. Vandarum*, *A. virens* and several other species.
- Amblostoma cernuum*.
- Ancistrochilus Thomsonianus*.
- Angraecum citratum*, *A. Dubuyssonii*, *A. Eichlerianum*, *A. falcatum*, *A. Kotschyianum*, *A. Scottianum* and several other commoner species.
- Anguloa*, 4 species, including *A. uniflora* and *A. virginalis*.
- Ansellia*, 4 species, including *A. humilis*.
- Appendicula anceps*.
- Arpophyllum spicatum*.
- Arundina bambusaeifolia*.
- Aspasia lunata*.
- Bartholina pectinata*.
- Bifrenaria Harrisoniae*, *B. vitellina*.
- Bletia catenulata* and 2 other species.
- Bletilla formosana*.
- Bonatea speciosa*.
- Brassavola*, 7 species, including *B. cucullata*, *B. glauca*, and *B. Digbyana*.
- Brassia*, 5 species, including *B. brachiata*, *B. Lawrenceana*, and *B. caudata*.
- Brassocattleya Lindleyana* (a natural hybrid).
- Broughtonia sanguinea*.
- Bulbophyllum*, many species, including *B. auricomum*, *B. barbigerrum*, *B. coccinnum*, *B. Dayanum*, *B. flavidum*, *B. Gentilii*, *B. galbinum*, *B. lilacinum*, *B. rufinum*, *B. saltatorium*, *B. uniflorum*, and *B. virescens*.
- Calanthe*, several species, among them *C. rubens* and a fine lot of hybrids, including a large specimen of *C. Dominyi*, the latter being the first artificially raised hybrid Orchid.
- Camaridium purpuratum*.
- Catasetum*, 20 species, including *C. Claesianum*, *C. Dar-*

winianum, with ♀ and ♂ flowers on the same inflorescence, *C. fimbriatum*, *C. planiceps*, *C. globuliflorum*, *C. Hookeri*, *C. spinosum*, and *C. Lemosii*.

Cattleya, many species and hybrids, including a few rare species such as *C. Walkeriana* and *C. Rex*, also the natural hybrid *C. sororia*.

Chondrorhyncha, 4 species, including *C. bicolor*, a plant new to cultivation.

Chysis, 3 species.

Cirrhaea viridipurpurea.

Cirrhopetalum, many species, including the new *C. campanulatum*, also many rarities, such as *C. Mastersianum*, *C. robustum*, *C. biflorum*, *C. longissimum*, *C. picturatum*, *C. Fascinator*, &c., &c.

Cleisostoma secundum.

Cochlioda, 4 species.

Coelia, 3 species, including a very fine specimen of the handsome *C. macrostachya*.

Coelogyne, 38 species, including *C. Huettneriana*, *C. graminifolia*, *C. sulphurea*, *C. perakensis*, *C. Rossiana*, *C. Lawrenceana*, *C. sparsa*, *C. Swaniana*, *C. testacea*, *C. Veitchii*, and *C. Mooreana*.

Colax jugosus.

Coryanthes macrantha.

Cryptophoranthus Dayanus.

Cynoches, 6 species bearing male flowers, including *C. stelliferum*, also two species, *C. maculatum* and *C. ventricosum*, with the rarely produced female flowers.

Cymbidium, 14 species, including *C. grandiflorum*, *C. Schroederi*, *C. Gammieanum*, *C. sinense*, and *C. pendulum*, also a number of fine hybrids.

Cynorchis compacta, *C. Lowiana*, *C. Morlandii*, and *C. kewensis*.

Cypripedium, 33 species and a large number of hybrids.

Cyrtopodium punctatum.

Dendrobium, 47 species, including *D. Bronckartii*, *D. Foxii*, *D. Sanderæ*, *D. Dearei*, *D. Dartoisianum*, *D. falcorostrum*, *D. longicornu*, *D. revolutum*, *D. sanguinolentum*, var. *album*, *D. Schuetzei*, *D. secundum*, *D. superbiens*, and *D. Victoria-Reginae*, also many fine hybrids.

Dendrocolla Pricei, a new species from Formosa.

Diacrium bicornutum.

Disa grandiflora.

Epidendrum, 31 species, including *E. Allemanii*, *E. ciliare*, *E. Cooperianum*, *E. equitans*, *E. Hartii*, *E. (Nanodes) Matthewsii*, *E. (Nanodes) Medusæ*, *E. purum*, *E. Wallisii*, and a new species from Costa Rica, viz. *E. (Nanodes) Lankesteri*.

Eria, 20 species, including *E. longispica*, *E. major*, *E. hyacinthoides*, *E. Corneri*, *E. convallarioides*, *E. rhodoptera*, and the type plant of *E. rhynchostyloides*.

Eulophia, 6 species, including *E. guineensis*, *E. Ledienii*, and the type plant of *E. paniculata*.

Eulophiella Elisabethæ, a large healthy specimen of this rare Orchid bore 11 racemes.

Gomesa planifolia and *G. crispa*.

- Gongora*, 4 species, including *G. grossa*.
Govenia tingens and *G. lagenophora*.
Grobysa galeata.
Haemaria discolor.
Hemipilia calophylla.
Hexadesmia crurigera and *H. fusiformis*.
Ione bicolor and *I. grandiflora*.
Ionopsis paniculata.
Isabelia virginialis.
Kefersteinia laminata and *K. graminea*.
Laelia, many species, including *L. crispilabia*, *L. Lundii*, *L. Gouldiana*, and *L. superbiens*.
Lanium Berkeleyi.
Leptotes bicolor.
Liparis, several species, including *L. Bowkeri*, *L. longipes*, and *L. guineensis*.
Lissochilus Krebsii.
Listrostachys, 12 species, including *L. Chailluana*, *L. bracteosa*, *L. caudata*, *L. forcipata*, *L. hamata*, and *L. Monteirae*.
Lockhartia robusta, *L. elegans*, and *L. lunifera*.
Luisia, 5 species, including *L. brachystachys*, and *L. Psyche*.
Lycaste, 16 species, including the new *L. peruviana*, also *L. gigantea*, *L. Dyeriana*, *L. lanipes*, and *L. xytriophora*.
Masdevallia, 52 species, including *M. deorsa*, *M. gemmata*, *M. Ephippium*, *M. Houtteana*, *M. Laucheana*, *M. Mooreana*, *M. O'Brieniana*, *M. Peristeria*, *M. polysticta*, *M. Reichenbachiana*, and *M. Wendlandii*.
Marillaria, many species, including *M. arachnites*, *M. grandiflora*, *M. elatior*, *M. madida*, *M. venusta*, *M. Sanderiana*, and *M. tenuifolia*.
Megacelinium, 7 species, including *M. Bufo* and *M. eburneum*.
Meiracyllium gemmae.
Microstylis commelynaefolia.
Miltonia, 12 species, including a fine specimen of *M. candida*.
Mormodes revolutum and *M. aromaticum*.
Mormolyce lineolata.
Mystacidium, 6 species, including *M. Germinyanum*, *M. pectinatum*, and the type plant of *M. angustum*.
Neobenthamia gracilis.
Oberonia ensiformis and *O. pachyrachis*.
Octomeria diaphana and 5 other species.
Odontoglossum, 41 species, and many fine hybrids.
Oncidium, 52 species, including *O. abortivum*, *O. Cebolleta*, *O. exasperatum*, *O. graminifolium*, *O. longipes*, *O. suave*, *O. maizaefolium*, *O. praestans*, *O. pumilum*, *O. trulliferum*, *O. uniflorum*, and *O. Walpura*.
Ornithidium densum, *O. Sophronitis*, and *O. coccineum*.
Ornithocephalus grandiflorus.
Otochilus porrectus.
Pelexia maculata.
Phaius, 3 species and a number of fine hybrids.
Phalaenopsis, 9 species, including *P. Sanderiana*, *P. pullens*, *P. Lueddemanniana*, and *P. tetraspis*.

- Pholidota*, 7 species, including *P. conchoidea*, *P. Lugardii*, *P. chinensis*, and *P. Convallariae*.
Phragmopedilum, 6 species, including *P. Sargentianum* and *P. caricinum*, also a number of hybrids.
Physoisiphon Loddigesii and *P. Lindleyi*.
Platanthera iantha.
Platyclinis, 7 species, including *P. arachnites*, *P. Cobbiana*, *P. latifolia*, and *P. filiformis*.
Pleione, 4 species, including *P. yunnanensis*.
Pleurothallis, 16 species, including the new *P. Birchenallii*.
Plocoglottis porphyrophylla.
Polystachya, 8 species, including *P. affinis*, *P. luteola*, *P. tessellata*, and *P. caespitosa*.
Prescottia plantaginifolia.
Promenaea stapelioides and *P. xanthina*.
Renanthera coccinea and *R. Imschootiana*.
Rodriguezia venusta and 4 other species.
Restrepia, 8 species, including *R. guttulata*, *R. pandurata*, and *R. antennifera*.
Rhynchosstylis retusa.
Saccolabium, 8 species, including the rare *S. bellinum* and *S. penangianum*.
Sarcanthus, 5 species, including *S. insectifer*, *S. pallidus*, and *S. secundus*.
Sarcochilus Fitzgeraldii and *S. Hartmanni*.
Satyrium odorum and *S. ligulatum*.
Scaphosepalum, 4 species, including *S. ochthodes*.
Scaphyglottis prolifera.
Schomburgkia rosea, *S. Thomsoniana*, and *S. Wallisii*.
Scuticaria Hadwenii and *S. Steelii*.
Sieverskingia peruviana, a very rare Orchid.
Sobralia, 6 species, including the new *S. valida*, also a number of garden hybrids.
Sophronitis cernua, *S. grandiflora*, and *S. violacea*.
Spathoglottis plicata and 2 hybrids.
Spiranthes picta.
Stanhopea, 12 species, including *S. guttulata*, *S. platyceras*, *S. ecornuta*, *S. elegantula* and *S. oculata*.
Stelis, 4 species, including the new *S. barbata* from Costa Rica.
Stenoglottis longifolia.
Stigmatostalix radicans.
Trichopilia, 7 species, including *T. Backhouseana* and *T. laxa*.
Theodorea gomezoides.
Thriaspium unguiculatum.
Thunia, 6 species and 2 hybrids.
Trias picta.
Trichosma suavis.
Vanda, 14 species, including *V. coerulescens*, *V. Dearei*, and *V. Watsonii*.
Warrea Hookeriana.
Warscewiczella Wendlandii.
Xylobium, 4 species, including the new *X. ecuadorensis*.
Zygopetalum, 4 species.
Zygosepalum rostratum.

Euphorbia Tirucalli.—When working up the Tropical African species of *Euphorbia* I came to the conclusion that the plant described and figured in Reede, Hortus Malabaricus, vol. 2, p. 85, t. 44, under the name of *Tiru Calli*, and upon which *Euphorbia Tirucalli*, Linn. was founded, could not be the same as any African species I had seen, so different did it appear by its mode of flowering in the forks of the branches and in its pedicellate flowers. At that time the flowers of the true *E. Tirucalli* of India were quite unknown to me, none being present upon any herbarium specimens I had seen. Subsequently, however, flowers of the true *E. Tirucalli* have been sent from India by Mr. Cecil E. C. Fischer, Deputy Conservator of Forests, Madras, which amply demonstrate that I was wrong in my conclusion that the plant which I have described under the name of *Euphorbia media* in the Flora of Tropical Africa, vol. 6, pt. 1, p. 556, was distinct from *E. Tirucalli*, Linn., as I now find upon comparison with the Indian specimens that *E. media* is unquestionably the same as *E. Tirucalli* and must rank as a synonym of that species.

Probably *E. Tirucalli* was introduced into India by the Portuguese from some part of East Africa, where it extends from German East Africa southwards as far as the Transkei in South Africa, growing as a big bush or tree up to 20 ft. high.

In Natal there is an extensive forest of *E. Tirucalli*, and about 1910, Dr. Aurel Schultz, of Durban, stated that rubber of good quality could be extracted from it by a process he had invented. In consequence of his researches and report a company has been formed and a rubber industry said to be of considerable importance is now established in Natal. The latex extracted from the trees is imported in the raw state to England, where the rubber is freed from the resinous and other matters mixed with it and then mixed with rubber of a better quality and used for making tyres for bicycles and motor cars.

The milky sap of *E. Tirucalli* produces a very disagreeable burning sensation when applied to the skin and affects some people more than others. Dr. J. Medley Wood, the Director of the Natal Herbarium at Durban, writes of it as follows:—"The sap of this plant is most virulent, as I found to my cost when living at Inanda. I simply broke off a small portion of the end of a branch when showing it to a lady, and suffered excruciating pain for nearly the whole of the night. All I could do was to bathe the part affected with cold water, as we had no doctor within more than 20 miles."

N. E. B.

Botanical Magazine for February.—The plants figured are *Ampelopsis megalophylla*, Diels & Gilg (t. 8537); *Actinidia chinensis*, Planch. (t. 8538); *Smilacina paniculata*, Mart. & Gal. (t. 8539); *Rondeletia cordata*, Benth. (t. 8540) and *Viola gracilis*, Sibth. & Sm. (t. 8541).

Ampelopsis megalophylla is a remarkably vigorous Vine, producing growths eight to ten feet long in a single summer, and has extraordinarily large leaves, sometimes nearly three feet long.

The leaves vary from pinnate to subtripinnate, and are green above and glaucous beneath. Its large cymes of fruit, at first red-purple, finally blackish, add to the value of the plant as an ornamental climber. The species is a native of Central China, and first appeared in cultivation in Europe in Mr. M. L. de Vilmorin's garden at Les Barres, where seeds were received in 1894. In 1901 the plant was introduced a second time by Messrs. J. Veitch & Sons, through their collector, Mr. E. H. Wilson. The specimen figured was sent to Kew by the Right Hon. L. Harcourt, M.P., from his garden at Nuneham.

The *Actinidia* is one of Messrs. Veitch's introductions from China, and the plant from which the material for the illustration was obtained was received from them in 1905. It grows freely in the Himalayan House, the plant there having stems some twenty feet long. Its orange-yellow flowers are $1\frac{3}{4}$ -2 inches across, borne in cymes springing from the axils of fallen leaves, and in the Kew plant are all functionally male. The fruits are edible, and have a flavour resembling that of the gooseberry.

Smilacina paniculata, a native of Guatemala and Southern Mexico, has been introduced by Messrs. F. Sander & Sons, of St. Albans, who sent to Kew the material for the figure, obtained from a plant which flowered in March, 1913. It is a glabrous herb with ovate-lanceolate long-acuminate leaves, 5-6 inches long, and terminal panicles about $2\frac{1}{4}$ inches long, striking in being entirely snowy-white. The plant is likely to be of some value in the greenhouse.

Rondeletia cordata is well-known in cultivation, having been introduced from Guatemala in 1844. It is often found in collections under the name of *Rogiera cordata*. Pentamerous and hexamerous flowers occur in the same inflorescence, and it has been observed that dimorphism exists in the relative length of the style and the position of the stamens. Of this useful and handsome plant there is a good specimen in the greenhouse at Kew.

Viola gracilis has deservedly become very popular during the last few years, and is now represented in gardens by various forms, differing in the size and colour of the flowers. The species was originally discovered on Mount Olympus in Bithynia. It has since been recorded from Macedonia and probably occurs also in Montenegro. The plate was prepared from a plant obtained for the Kew collection by purchase in 1907.

The Gardens Bulletin, Straits Settlements.—We welcome the continuation of the Agricultural Bulletin of the Straits and Federated Malay States which has appeared as Vol. I. No. 6 of the third series of that Journal, under the editorship of Mr. I. H. Burkill. Five numbers of the Bulletin were published between January and May, 1912, and the publication has now been resumed by the issue of No. 6 under an altered title on December 15th, 1913. The *Gardens Bulletin* is to be an occasional publication, as it was when originally started in 1891, since the Federated Malay States have now an agricultural journal of their own.

The number under notice contains several original articles of interest, and we observe with pleasure that original articles are to be a feature of the new series, and that market reports and proceedings of meetings will not be included.

Attention may be drawn to a long and useful article on coconut beetles, and to the account of the explosive flowers of the orchid *Plocoglottis porphyrophylla* among the "Notes on plants of interest in the Singapore Gardens."

Botanical Progress in British Columbia.—The following information has been extracted from an interesting letter received from Mr. J. Davidson, the Provincial Botanist of British Columbia:—

The botanical work in British Columbia is making great progress, and all through the Province people are interested in the work and are ready to respond to requests for information. A complete botanical survey is contemplated and material and data are being collected for this purpose. A herbarium is being formed and already several thousands of specimens have been obtained, while in less than three years several plants new to British Columbia and probably some new species have been collected. Correspondents in different parts of the Province supply specimens and information regarding the plants in their immediate neighbourhood, while where there are no correspondents the flora is ascertained by exploration trips. The Surveyor-General allows his men, who are exploring new regions of British Columbia, to collect material and data for the botanical survey.

Last year the formation of a botanic garden and arboretum was commenced, and it is hoped that over 1500 native seed plants will be cultivated in the area of ground set aside by the Government. Already 500 species are established and as very many of these are showy and suitable for garden purposes it is hoped that the collection will increase the interest of the general public in the wealth and beauty of their native plants. It is expected that another botanic garden will be started this summer in connection with Stanley Park on the Pacific coast.
